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A GUIDE TO THE WOOD FURNITURE CTG AND NESHAP

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND

In December of 1995, the U.S. Environmental Protection Agency (EPA) issued national emission standards for hazardous air pollutants (NESHAP) to control emissions from wood furniture manufacturing operations. The regulation appeared in the December 7, 1995 edition of the Federal Register (volume 60, No. 235, beginning on page 62930). The level of emissions control required by the NESHAP is based on the maximum achievable control technology (MACT). Therefore, these standards are sometimes referred to as MACT standards.

The Clean Air Act as amended in 1990 (CAA) directs the EPA to regulate emissions of 189 toxic chemicals (hazardous air pollutants (HAP)) from a wide range of industrial sources. In 1992, surface coating of wood furniture was listed as a source category to be regulated under the CAA because many of the coatings, adhesives, and solvents used in the wood furniture industry contain toxic chemicals such as toluene, xylene, methanol, methyl ethyl ketone, glycol ethers, and formaldehyde. Therefore, the EPA is regulating HAP emissions from wood furniture manufacturing facilities to meet the requirements of the CAA. The EPA estimates that this regulation will reduce nationwide HAP emissions from wood furniture manufacturing facilities by 32,000 tons per year.

In September of 1995, EPA issued a draft Control Techniques Guidelines (CTG) document that recommends reasonably available control technology (RACT) for reducing volatile organic compound (VOC) emissions from wood furniture finishing and cleaning operations. State and/or local agencies may use these guidelines to establish their own regulations based on EPA's recommendation for RACT.

The goals of the NESHAP and CTG are different. The goal of the NESHAP is to reduce HAP emissions from wood furniture manufacturing facilities located nationwide, while the goal of the CTG is to reduce VOC emissions from wood furniture facilities located only in areas classified as ozone nonattainment (see Appendix C). However, because many of the

coatings and solvents used by the wood furniture industry contain chemicals that are both VOC and HAP, the goals of the two programs overlap.

Both the NESHAP and the CTG were developed through a regulatory negotiation process. In a regulatory negotiation, EPA works with members of industry, State representatives, and representatives from environmental groups to try to reach an agreement regarding the level of control that should be required, the format of the standards, compliance options, and recordkeeping and reporting requirements. The wood furniture regulatory negotiation Committee reached consensus on all issues.

1.2 PURPOSE OF GUIDEBOOK

The purpose of this guidebook is to provide a straightforward overview of the wood furniture manufacturing NESHAP to equip businesses with the basic information they need to comply with the regulation. This guidebook is not a complete and full statement of the legal and technical requirements of the regulation. See 40 CFR Part 63, Subpart JJ (Appendix F of this guidebook) for the complete text of the regulation.

This guidebook also presents an overview of the recommended, or presumptive, RACT requirements. Throughout the manual, these will be referred to as the CTG requirements. However, the CTG is only a guidance document that contains a model rule for States to use in developing their own rules. Because State requirements may vary from the CTG requirements presented in this manual, wood furniture manufacturers should contact their State or local agency to obtain a copy of the applicable rule for their facility and familiarize themselves with the requirements of that rule.

This manual also includes summary tables and example calculations that are designed to assist you in understanding and complying with the wood furniture NESHAP. Example recordkeeping and reporting forms are also included that you can adapt to your own operations.

The EPA may revise this guidebook without public notice to reflect any future amendments to the Wood Furniture NESHAP, or to clarify and update text as appropriate. Any proposed and final amendments to the Wood Furniture NESHAP will be published in the Federal Register, which will include the effective date of such amendments. Accordingly, affected sources should review Federal Register notices to determine whether the Wood

Furniture NESHAP has been amended after the date of this Guidebook, or after the date of publication of their edition of the Code of Federal Regulations containing the NESHAP (40 CFR Part 63, Subpart JJ).

1.3 ORGANIZATION

Chapter 2 of this guidebook presents an overview of the NESHAP and CTG applicability and requirements. Chapters 3, 4, and 5 discuss the work practice standards, compliance options, and recordkeeping and reporting requirements, respectively. Available control technologies are discussed in Chapter 6, while Chapter 7 presents an overview of the Title V operating permit program. Finally, Chapter 8 presents pollution prevention options and discusses how to develop a pollution prevention program. The appendices contain acronyms and definitions, contacts, a listing of designated ozone nonattainment areas, a detailed table of contents for the NESHAP, a list of volatile hazardous air pollutants (VHAP), the text of the wood furniture manufacturing NESHAP, and example reporting forms.

CHAPTER 2

OVERVIEW OF THE CTG AND NESHAP

2.1 WOOD FURNITURE CTG - APPLICABILITY AND REQUIREMENTS

As discussed in the introduction, the CTG serves only as a guideline that State and/or local agencies may use in developing their own rules. (Throughout the remainder of the manual we will refer to States only. However, the reader should be aware that in some cases a local agency may be the implementing agency rather than the State.) The CTG includes a recommendation for a presumptive norm for RACT. Any State rules must be as stringent as the presumptive norm for RACT. However, in many cases there is nothing that precludes the State from making their own rules more stringent.

2.1.1 Applicability of the CTG

Figure 2-1 can be used to assist facilities in determining whether they are subject to the CTG, NESHAP, neither, or both. The CTG is applicable to wood furniture manufacturing facilities located in ozone nonattainment areas, or in the ozone transport region, that emit or have the potential to emit 25 tons or more of volatile organic compounds (VOC). The applicability cutoff is even lower for facilities located in extreme nonattainment areas. (Currently, the only extreme nonattainment area is the Los Angeles, California area.) Wood furniture manufacturing facilities located in extreme ozone nonattainment areas that emit or have the potential to emit 10 tons or more of VOC are subject to RACT. Appendix C contains a current listing of ozone nonattainment areas. However, this list is continually changing, so you should contact your State or local agency to determine the current status of your area.

The EPA defines wood furniture manufacturing facilities as those operating under the standard industrial classification (SIC) codes presented in Table 2-1. The EPA considers facilities manufacturing these products, or components of these products, to be wood furniture manufacturing facilities. Three of these SIC codes, 2519, 2531, and 2599, include facilities manufacturing nonwood products. For example, SIC 2531 includes manufacturers of seats for automobiles and airplanes. These facilities will not be subject to the CTG, because they are not wood furniture manufacturers.

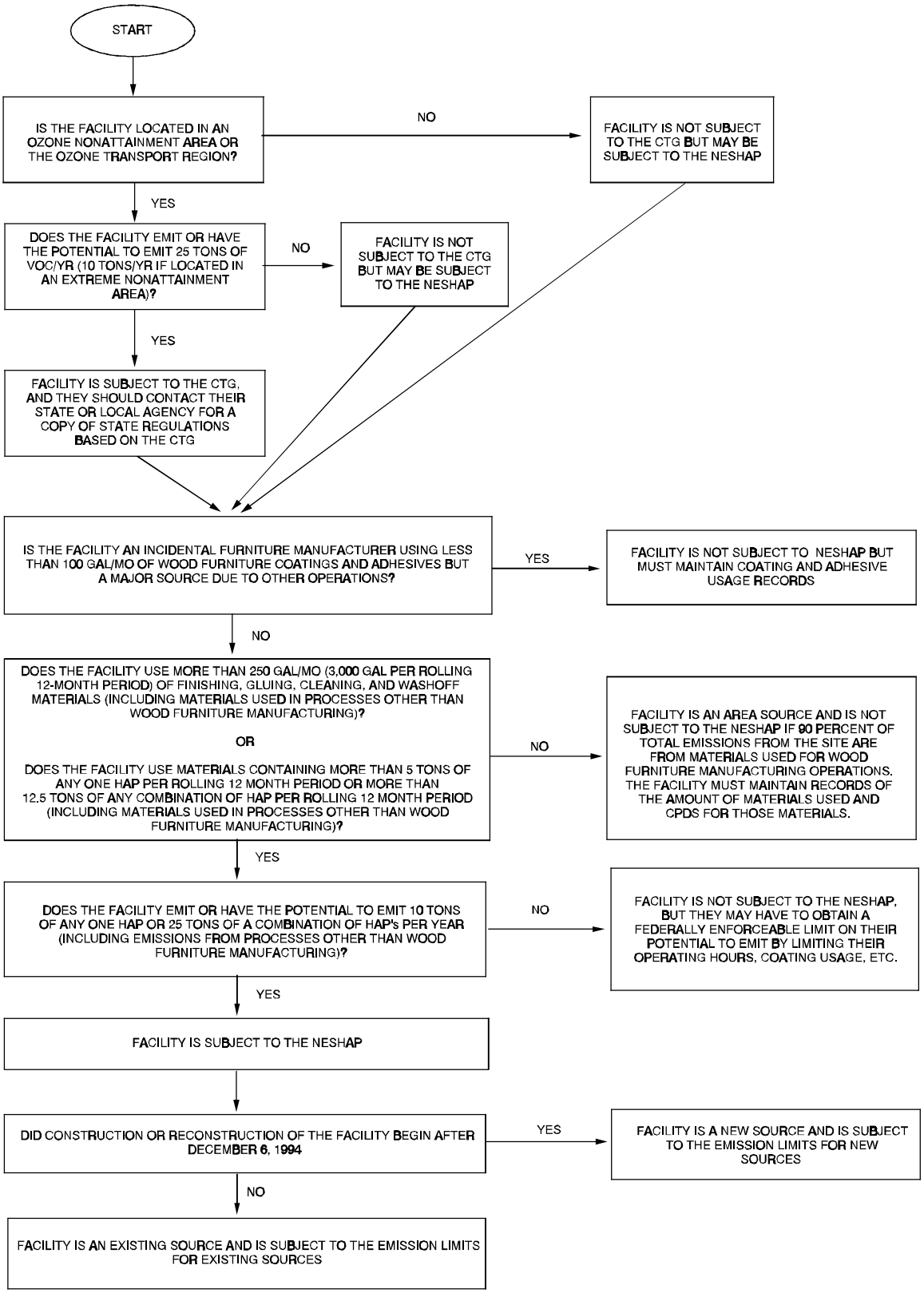

Figure 2-1. Determining the applicability of the CTG and NESHAP to your facility.

TABLE 2-1. WOOD FURNITURE SIC CODES

SIC code	Industry	Typical products
2434	Wood kitchen cabinets	Cabinets (to be built-in) Cabinets (factory made) Vanities
2511	Wood household furniture	Beds, bookcases, chairs, dressers, stools, tables
2512	Upholstered household furniture	Chairs, sofas
2517	Wood television and radio cabinets	Television cabinets, sewing machine cabinets, stereo cabinets
2519	Household furniture, not elsewhere classified	Bassinets; reed, rattan, and other wicker furniture, garden and lawn furniture
2521	Wood office furniture	Desks, filing cabinets, bookcases, chairs
2531	Public building and related furniture	Benches, bleachers, church furniture
2541	Wood partitions and fixtures	Shelves, lockers, office and store fixtures, prefabricated partitions
2599	Furniture and fixtures, not elsewhere classified	Furniture for hospitals, restaurants, bowling centers, and ships
5712	Furniture stores	Custom made cabinets

While these SIC codes represent the majority of facilities that EPA considers wood furniture manufacturers, States may choose to extend their rules to other operations. For example, some States have developed rules for manufacturers of wood products so they may include limitations for manufacturers of items such as musical instruments or doors.

2.1.2 Compliance Date

States must provide for affected sources to install and operate the required control devices or implement the required procedures in the presumptive norm for RACT no later than May 20, 1998.

2.1.3 CTG Reference Control Technologies

The CTG identifies two reference control technologies as presumptive RACT. The reference control technologies include emission limitations for topcoats or for sealers and topcoats, expressed as a limitation on the pounds of VOC emitted per pound of solids used (lb VOC/lb solids) for these coatings. The two reference control technologies are presented in Table 2-2.

TABLE 2-2. CTG REFERENCE CONTROL TECHNOLOGIES AND CORRESPONDING EMISSION LIMITS

Reference control technology	VOC limit, lb VOC/lb solids[a]
Finishing operations	
Waterborne topcoats	0.8
Higher solids sealers and topcoats	
- Sealers	1.9
- Topcoats	1.8
- Acid-cured alkyd amino vinyl sealers	2.3
- Acid-cured alkyd amino conversion varnishes	2.0
Cleaning operations	
Waterborne strippable spray booth coating	0.8

[a]Represents VOC limit as applied, that is, including the contribution of thinners or other solvents added to the coating.

A facility may choose to use either of the reference control technologies to meet the RACT requirements. The CTG also limits the VOC content of strippable spray booth coatings to 0.8 lb VOC/lb solids, as applied.

While waterborne topcoats and higher solids sealers and topcoats are the reference control technologies, facilities may choose to use methods other than these to comply with the rule. The model rule that EPA developed based on the CTG allows facilities to use a compliant coatings approach, an averaging approach, an add-on control device, or a combination of methods as long as they are achieving an emission reduction greater than or equal to that achieved by the reference control technologies. Chapter 4 includes a detailed discussion of these compliance methods, including example calculations for determining equivalency.

2.2 WOOD FURNITURE NESHAP - APPLICABILITY AND REQUIREMENTS

The level of control required by the NESHAP is based on MACT. Unlike RACT, which addresses VOC emissions, MACT is aimed at reducing emissions of hazardous air pollutants (HAP). While the majority of HAP are VOC, not all VOC are HAP. Appendix E contains a list of volatile HAP (VHAP) that will be regulated under this NESHAP.

In addition to regulating VHAP emissions from finishing and cleaning operations, the NESHAP will also regulate emissions from some gluing operations. The NESHAP includes emission limitations for contact adhesives, and many of the work practice standards that are discussed in Chapter 3 also apply to gluing operations.

2.2.1 Applicability of NESHAP

The NESHAP is a national standard that applies to wood furniture manufacturing facilities that emit or have the potential to emit 10 tons or more of any HAP or 25 tons or more of any combination of HAP. These sources are known as major sources. Wood furniture facilities are defined as they are for the CTG (see Table 2-1). However, in determining whether or not a source is major, HAP emissions from all sources at the facility must be accounted for. For example, a facility may manufacture metal and wood furniture. Although the NESHAP will only apply to the wood furniture manufacturing operations, emissions from the metal furniture manufacturing operations must be included when determining whether or not the source is major.

However, if a facility only performs incidental wood furniture manufacturing but is a major source due to other unrelated activities, the facility is not subject to the regulation if no more than 100 gallons per month of wood furniture coatings and adhesives are used. This exemption would include operations such as hobby shops on military bases or maintenance shops at chemical plants that manufacture wood furniture items such as bookshelves for on site use. These facilities must maintain records to demonstrate that their usage of wood furniture coatings and adhesives is no more than 100 gallons per month.

Sources using less than 250 gallons per month, or 3,000 gallons per rolling 12-month period, of coating, gluing, cleaning, and washoff materials, including materials used for operations other than wood furniture manufacturing, are area sources and are not subject to the NESHAP if the finishing materials, adhesives, cleaning solvents, and washoff solvents

account for at least 90 percent of annual emissions at the plant site. These sources must also maintain records that demonstrate their material usage is below these levels. A rolling 12 month period includes the previous 12 months of operation at the facility. Facilities should note that this limitation includes all coating, gluing, cleaning, and washoff materials, whether those materials contain HAP or not.

Sources that use materials containing no more than 5 tons per rolling 12 month period of any one HAP or 12.5 tons per rolling 12 month period of any combination of HAP are also considered area sources under the NESHAP. These facilities will be required to maintain records demonstrating that their actual emissions are less than these cutoffs.

2.2.2 Compliance Dates

Table 2-3 presents the compliance dates for existing facilities subject to the NESHAP. An existing facility's compliance date is determined by its actual emissions for the year 1996. New sources must comply with the provisions of the NESHAP upon promulgation of the NESHAP or upon startup, whichever is later. For this rule, facilities are considered new sources if construction commenced on or after December 6, 1994.

TABLE 2-3. COMPLIANCE DATES FOR THE NESHAP FOR EXISTING SOURCES

Emissions	Compliance date
<50 tons of HAP/yr	December 7, 1998
>50 tons of HAP/yr	November 21, 1997

2.2.3 NESHAP Emission Limitations

A summary of the NESHAP emission limitations is presented in Table 2-4. These include limitations on the VHAP content of both finishing materials and contact adhesives and a limit on the VOC content of strippable spray booth coatings.

Note that the NESHAP includes emission limitations for both existing and new sources. Wood furniture manufacturing facilities that begin construction or reconstruction after the proposal date, that is, after December 6, 1994, are considered new sources.

TABLE 2-4. SUMMARY OF NESHAP EMISSION LIMITS

Emission point	Existing source[a]	New source[a]
Finishing operations		
(a) Achieve a weighted average VHAP content across all coatings (lb VHAP/lb solids, as applied);	1.0	0.8
(b) Use compliant finishing materials (lb VHAP/lb solids, as applied)		
-stains	1.0	1.0
-washcoats	1.0[b]	0.8[b]
-sealers	1.0	0.8
-topcoats	1.0	0.8
-basecoats	1.0[b]	0.8[b]
-enamels	1.0[b]	0.8[b]
-thinners (maximum %VHAP)	10.0	10.0
(c) Use a control device; or	1.0[c]	0.8[c]
(d) Use a combination of (a), (b), and (c)	1.0	0.8
Cleaning operations		
Strippable spray booth coating (lb VOC/lb solids, as applied)	0.8	0.8
Gluing operations		
(a) Use compliant contact adhesives (lb VHAP/lb solids, as applied) based on the following criteria:		
i. For aerosol adhesives, and for contact adhesives applied to nonporous substrates	NA[d]	NA[d]
ii. For foam adhesives used in products subject to flammability testing;	1.8	0.2
iii. For all other contact adhesives (including foam adhesives used in products not subject to flammability testing but excluding aerosol adhesives and excluding contact adhesives used on nonporous substrates); or	1.0	0.2
(b) Use a control device	1.0[e]	0.2[e]

[a]The limits refer to the maximum VHAP/VOC content, as applied.
[b]Washcoats, basecoats, and enamels must comply with the limits presented in this table if they are purchased premade, that is, if they are not formulated onsite by thinning other finishing materials. If they are formulated onsite, they must be formulated using compliant finishing materials (i.e., those that meet the limits specified in this table) and thinners containing no more than 3.0 percent VHAP by weight.
[c]The control device must operate at an efficiency that is equivalent to no greater than 1.0 pound of VHAP (0.8 for new sources) being emitted per pound of solids used.
[d]There is no limit on the VHAP content of these adhesives.
[e]The control device must operate at an efficiency that is equivalent to no greater than 1.0 pound of VHAP (0.2 for new sources) being emitted per pound of solids used.

Reconstruction is the replacement of components of a source to the extent that the fixed capital cost of the new components exceeds 50 percent of the fixed capital cost that would be required to construct a comparable new source.

As with the CTG, there are several options a facility may use to comply with the emission limits for finishing operations. Chapter 4 provides additional detail on each of the compliance methods, including examples of the calculations to be used to demonstrate compliance.

The standards for finishing operations limit the pounds of VHAP per pound of solids for selected coatings or as an average across all coatings used at the facility. Because many facilities formulate their washcoats, basecoats, and enamels onsite by thinning other types of finishing materials (for example, many facilities thin their sealers to use as washcoats) the regulation contains guidance that is aimed at reducing the recordkeeping burden on these facilities. If the facility does formulate these coatings onsite, then it will be deemed compliant as long as the finishing material that is thinned is compliant and thinners with a VHAP content of no more than 3.0 percent are used to thin the coating. For example, if a facility thins its sealer to make washcoat, the facility does not have to maintain records of the VHAP content of the washcoat as long as the sealer has a VHAP content of no more than 1.0 lb VHAP/lb solids (0.8 for new sources) and the thinner has a VHAP content no greater than 3.0 percent by weight. If the facility purchases washcoat, however, it must demonstrate that the washcoat is compliant.

Contact adhesives are the only type of adhesive regulated by the standard. In the regulation, foam adhesives are considered a subset of contact adhesives, and they have a different emission limitation depending upon whether the product in which they are used is subject to flammability testing. Foam adhesives used in products subject to flammability testing, which is often required for office and institutional furniture, have a less stringent emission limit because testing has shown that products made with waterborne adhesives may not pass the flammability tests. However, foam adhesives used by new sources must meet the same emission limit as all other contact adhesives, regardless of any flammability testing that may be required. Note that aerosol adhesives and contact adhesives used on nonporous

substrates (rubber, metal, rigid plastic, and flexible vinyl) are not subject to emission limits under this rule.

CHAPTER 3

WORK PRACTICE STANDARDS

Work practice standards are an integral part of both the CTG and the NESHAP. In general, the work practice standards are aimed at reducing coating, cleaning solvent, and washoff solvent usage. Many facilities will have already implemented a number of these work practices because, in addition to reducing emissions, they also reduce worker exposure to solvents and, in many cases, operating costs. Most of the work practice standards are common to both the CTG and the NESHAP, although a few are associated with the NESHAP only. Section 3.1 includes a discussion of the work practice standards that are common to both the CTG and NESHAP, while Section 3.2 addresses those work practice standards that are required by the NESHAP only.

3.1 CTG AND NESHAP WORK PRACTICE STANDARDS

A summary of the work practice standards that are required by both the CTG and NESHAP is presented in Table 3-1. Chapter 5 includes a discussion of recordkeeping and reporting requirements associated with the work practice standards. Guidance on developing a site-specific pollution prevention program, which should include the work practice standards presented here, is provided in Chapter 8. Also included in Chapter 8 is a discussion of elements that should be included in an operator training program, one of the work practice standards required by both the CTG and NESHAP.

Following is a brief discussion of each of the work practice standards.

3.1.1 Application Equipment Requirements

Both the CTG and the NESHAP limit the use of conventional air spray guns. Facilities are allowed to use these guns only under any of the following conditions:

1. If they are using the guns to apply coatings that have a VOC content no greater than 1.0 lb VOC/lb solids, as applied;

2. If they are using the gun for touchup and repair that occurs either after the completion of the finishing operation or after the application of stain and before the application of other types of finishing materials. In addition, any materials used for touchup

TABLE 3-1. WORK PRACTICE STANDARDS FOR THE CTG AND NESHAP[a]

Emission source	Work practice
Finishing operations	
Equipment leaks	Develop a written inspection and maintenance plan to address and prevent leaks. Inspections must be made once per month.
Storage containers, including mixing equipment	Keep containers used for storing or mixing VOC or HAP, or materials containing VOC or HAP, covered when not in use.
Application equipment	Discontinue use of conventional air spray guns.[b]
Cleaning and washoff operations	
Gun/line cleaning	- Collect solvent into a closed container. - Cover all containers associated with cleaning when not in use.
Spray booth cleaning	Use solvents for cleaning spray booths only under certain conditions.[c]
Washoff/general cleaning	- Keep washoff tank covered when not in use. - Minimize dripping by tilting and/or rotating the part to drain as much solvent as possible. Allow sufficient dry time for the part. - Maintain a log of the number of parts washed off and the reason for the washoff. - Maintain a log of the quantity and type of solvent used for washoff and cleaning, as well as the quantity of solvent reused for other operations at the facility and the quantity of solvent sent offsite for disposal.
Miscellaneous	
Operator training	All operators shall be given annual training on proper application methods, cleaning procedures, and equipment use.
Implementation plan	Develop a plan to implement these work practice standards and maintain onsite.

[a]The work practice standards apply to both existing and new major sources.
[b]Conventional air spray guns will be allowed only in any of the following instances:

- when they are used to apply finishing materials that emit less than 1.0 lb VOC/lb solids;
- touchup and repair under limited conditions;
- when spray is automated;
- when add-on controls are employed;
- if the cumulative application is no more than 5.0 percent of the total gallons of finishing material applied; or
- if the permitting agency determines that it is economically or technologically infeasible to use other application technologies.

[c]Solvents can be used for cleaning conveyors and their enclosures and metal filters. Limited quantities, no more than 1.0 gallon, can also be used for spot cleaning when the spray booth coating is being replaced.

and repair after the stain application must be applied from a container with a volume of no more than 2.0 gallons.

3. If the guns are automatic;

4. If the guns are used in a spray booth or other application station where emissions are directed to a control device;

5. If the guns are only used for applying small quantities of finishing material. The total amount of finishing material applied with the conventional air spray gun must be no more than 5.0 percent of the total amount of finishing material used in that semiannual period; or

6. If the gun is used to apply stain and the facility can demonstrate that it is technically or economically infeasible to use another spray application technology.

To qualify for exemption (6), the facility must submit a videotape, a technical report, or some other type of documentation to the permitting agency that supports the facility's claim of technical or economic infeasibility. There are two factors that the facility can use either singly or in combination to support their claim. These are:

1. The production speed is too high or the part shape is too complex for one operator to finish the part and the spray booth is not large enough for an additional operator; or

2. The part has an excessively large vertical spray area, making it difficult to avoid sagging or runs in the stain.

A final determination of whether the facility may use the conventional air spray gun under exemption (6) will be made by the permitting authority.

3.1.2 Operator Training Program

Each facility subject to the CTG or NESHAP must train all employees who are involved in finishing, gluing, cleaning, or washoff operations annually. All personnel hired before the effective date of the standard, which will vary according to the size of the facility for the NESHAP and will be based upon the date established by the States in their rules that are based on the CTG, must be trained within 6 months of the effective date. Personnel who are hired after the effective date of the standard must be trained upon hiring. All personnel must be retrained annually.

Operator training should include instruction in application techniques, cleaning and washoff procedures, equipment setup and adjustment, and management of waste solvent from cleaning and washoff operations. The facility must develop a training program that includes a list of current personnel that must be trained, an outline of the subjects covered in the initial and refresher training, and a description of how the facility will document that personnel have successfully completed the training program.

3.1.3 Inspection and Maintenance Plan

Each facility must also develop an inspection and maintenance plan that addresses equipment leaks. Facilities are required to visually check all equipment used to transfer or apply finishing materials or organic solvents at least once a month to ensure there are no equipment leaks. The inspection and maintenance plan should include a schedule for inspections and a way to document the date of each inspection as well as any repairs that were made. After identifying the leak, the facility must attempt to repair the leak within 5 days and make final repairs within 15 days, unless the leaking equipment has to be replaced, in which case the facility is allowed 3 months to complete repairs.

3.1.4 Cleaning and Washoff Solvent Accounting Program

Facilities are required to develop a program for tracking the amount and type of organic solvent used for cleaning and washoff each month. They must also track the amount of spent solvent that is generated from each cleaning operation each month, the amount of that spent solvent that is reused in-house for operations other than cleaning or washoff, and the amount that is sent offsite for disposal. Finally, the program should provide a mechanism for tracking the number of pieces that are washed off and the reason for the washoff.

3.1.5 Additional Work Practice Standards

3.1.5.1 Spray Booth Cleaning. The CTG and NESHAP limit the types of cleaners that can be used for spray booth cleaning. Unless operators are cleaning conveyors, continuous coaters and their enclosures, or metal filters, they may not use cleaning compounds containing more than 8.0 percent of VOC by weight. The 8.0 percent limit should still allow facilities to use many commercial cleaners, but it precludes the use of organic solvent. Facilities may, however, use organic solvents in small quantities, no more

than 1.0 gallon per booth, if they are replacing the strippable spray booth coating or other protective material used to cover the booth.

3.1.5.2 Storage Containers. All containers that are used to store finishing, cleaning, or washoff materials must be closed unless an operator is emptying or filling the container. This includes drums that are used to hold wiping rags.

3.1.5.3 Gun and Line Cleaning. Organic solvent used to clean spray guns and lines must be collected in a container that is kept closed except when an operator is emptying or filling the container.

3.1.5.4 Washoff Operations. Tanks used for washoff must be kept closed when they are not being used. Operators should also try to minimize dripping from the part that has been washed off by tilting or rotating the part so that the solvent can drain back into the tank.

3.1.6 Work Practice Implementation Plan

Each facility must develop a work practice implementation plan that documents how they will ensure that all of the work practice standards are being followed. The operator training program, the inspection and maintenance plan, and the solvent accounting program should be included in the work practice implementation plan along with examples of record forms or checklists developed by the facility as a part of these plans. Facilities should develop checklists that employees can use to document the results of facility-wide inspections. For example, facilities should have someone conduct frequent inspections of the facility to ensure that storage containers are closed, solvent used for gun and line cleaning is being collected in a closed container, and washoff tanks are closed. Chapter 8 includes examples of checklists facilities may want to use.

3.2 ADDITIONAL WORK PRACTICE STANDARDS FOR THE NESHAP

The NESHAP has two work practice standards that are not required by the CTG. In addition, the work practice standard requiring that containers used for storing finishing, cleaning, and washoff materials remain closed is extended to include containers used to store adhesives. The major work practice standard required by the NESHAP that is not required by the CTG is the formulation assessment plan for finishing operations.

3.2.1 Formulation Assessment Plan for Finishing Operations

Table 3-2 presents a partial list of what the regulation refers to as VHAP of potential concern. These VHAP of potential concern were identified by several coating suppliers as being present in some coating formulations used by the wood furniture industry. The first step for the facility in developing their formulation assessment plan is to identify any chemicals from this list that are used in their finishing materials or thinners. The facility must then determine how much of the chemical they used in 1994, 1995, and 1996. The highest value from those 3 years is considered the baseline level of usage for that chemical. Note that VHAP of potential concern used in adhesives should not be included in the baseline level. The formulation assessment plan only applies to VHAP of potential concern used in finishing materials.

TABLE 3-2. VHAP OF POTENTIAL CONCERN IDENTIFIED BY INDUSTRY

Chemical	CAS No.	EPA de minimis, tons/yr
Dimethyl formamide	68122	1.0
Formaldehyde	50000	0.2
Methylene chloride	75092	4.0
2-Nitropropane	79469	1.0
Isophorone	78591	0.7
Styrene monomer	100425	1.0
Phenol	108952	0.1
Diethanolamine	11422	5.0
2-Methoxyethanol	109864	10.0
2-Ethoxyethyl acetate	111159	5.0

Sources using a control device to reduce emissions should adjust their usage based on the overall control efficiency of the control system. Because some portion of the formaldehyde and styrene in a coating becomes part of the cured resin, the regulation provides guidance on how to calculate usage of these chemicals. For formaldehyde, usage is based on the amount of free formaldehyde present in the finishing material when it is applied. For styrene monomer, usage is calculated by multiplying the amount of styrene monomer in the finishing material when it is applied by a factor of 0.16.

Facilities must continue to track their usage of each VHAP of potential concern. However, they only have to track usage of those VHAP that are present in a finishing material in a large enough quantity that it must be reported on the material safety data sheet (MSDS). If, after November 1998, a facility's usage of the VHAP exceeds the baseline usage level for that VHAP, the facility must notify the permitting authority in writing that they have exceeded their baseline level, the amount by which they have exceeded the baseline, and the reasons why. If the facility has exceeded the baseline for any of the reasons cited below, and they are in compliance with any State regulations or requirements for that VHAP, the facility does not have to take any further action.

1. The exceedance is no more than 15.0 percent above the baseline level;

2. The facility's usage of the VHAP is less than the de minimis value for that VHAP as presented in Table 3-2;

3. The facility is in compliance with its State's air toxics regulations or guidelines for that VHAP; or

4. The VHAP is being used in a finishing material with a VOC content of no more than 1.0 lb VOC/lb solids, as applied.

If the increase above the baseline level is due to some reason other than those listed above, the facility must then refer to their permitting authority to discuss the reason for the increase and whether or not there are practical and reasonable technology-based solutions for reducing the usage. Cost, quality, and marketability of the product, as well as successful usage of the technology by other wood furniture manufacturers, may all be considered in determining whether a solution exists. The facility and the permitting authority may also agree upon other factors that should be used for such an evaluation. If there are no practical and reasonable solutions, the facility would not have to take any further action. If there are solutions, the facility must develop a plan to reduce usage of the VHAP to the extent feasible. The plan should address the approach the facility will use to reduce usage, a timetable for reducing usage, and a schedule for reporting progress to the permitting authority.

There may be cases in which a facility begins using a VHAP of potential concern for which a baseline level has not been previously established. In those cases, the baseline level is equal to the de minimis level, based on 70 year exposure levels and data provided in the

proposed rulemaking pursuant to section 112(g) of the Clean Air Act, for that VHAP. A complete listing of all VHAP of potential concern is presented in Table A-1. If usage of the VHAP is greater than the de minimis level, then the facility must follow the same procedures as those in the previous paragraphs for exceeding an established baseline level. Any of the reasons listed in (1) through (4) will excuse the facility from further action.

3.2.2 Composition of Cleaning and Washoff Solvents

The NESHAP also prohibits the use of solvents containing any of the chemicals listed in Table 3-3 for cleaning and washoff operations. However, the restriction is only limited to chemicals that are present in the solvent at a level high enough that they have to be reported on the MSDS.

TABLE 3-3. at end of document

TABLE 3-3 at end of document

CHAPTER 4

OPTIONS FOR COMPLYING WITH THE CTG AND OPTIONS FOR COMPLYING WITH THE NESHAP

Both the CTG and NESHAP include four options that a facility can use to comply with the regulations. Table 4-1 summarizes these options. Each of these options has advantages and disadvantages. In general, the more flexibility the option provides the facility, the greater the recordkeeping requirements associated with the option.

TABLE 4-1. COMPLIANCE METHODS FOR THE CTG AND NESHAP

Compliance method	CTG	NESHAP
Compliant coatings	Yes	Yes
Averaging	Yes, but may be limited by State	Yes, finishing only
Add-on control device	Yes	Yes
Combination	Yes	Yes

While the compliance options are similar for the CTG and NESHAP, each option has somewhat different requirements. In this chapter, we will discuss each of the options for the CTG and the NESHAP and present example calculations that a facility can use to demonstrate they are complying with each option. A detailed discussion of the recordkeeping and reporting requirements associated with each option is presented in Chapter 5.

4.1 CTG COMPLIANCE OPTIONS

4.1.1 Compliant Coatings

The reference control technologies and corresponding emission limits for facilities choosing to use a compliant coatings approach to meet the requirements of the CTG are summarized in Table 2-2. As shown in the table, facilities can choose to use topcoats with a VOC content no greater than 0.8 lb VOC/lb solids, as applied, or sealers with a VOC content no greater than 1.9 lb VOC/lb solids, as applied, and topcoats with a VOC content of no greater than 1.8 lb VOC/lb solids, as applied. Less restrictive emission limits apply for

facilities using acid-cured alkyd amino vinyl sealers and/or acid-cured alkyd amino conversion varnishes.

For facilities using compliant coatings only, demonstrating compliance is straightforward and relatively simple. First, the facility must maintain a certified product data sheet (CPDS) for each coating subject to the emission limit. (A certified product data sheet is documentation furnished by the coating supplier or an outside laboratory that provides the VOC content, VHAP content, solids content, and density of a coating or solvent.) For example, if a facility chooses to comply using higher solids sealers and topcoats, they must maintain a CPDS for each sealer and topcoat being used by the facility. If the facility uses the coating as it is supplied, that is, if they do not add any thinner or other solvent to the coating, then the CPDS will be all the facility needs to demonstrate compliance.

However, most facilities add thinner or other solvent to the coatings they purchase before they are applied. A facility may add thinner to adjust the viscosity or the color of the coating or to slow down or speed up drying of the coating. Because the emission limits presented in Table 2-2 are based on the VOC content of the coating as it is applied, the facility must account for the addition of the thinner. Example 1 demonstrates how to calculate the VOC content of a coating after thinning.

Facilities that thin their coatings before using them must maintain copies of the CPDS showing the VOC content, solids content, and density of the coating as supplied. They must also maintain data sheets showing the VOC content of the as-applied coating in order to demonstrate compliance. While this imposes an additional burden on the facility, it is the only way the permitting authority has of determining what the VOC content of the coating is at the time it is being used.

Setting up a system to determine the VOC content of coatings as they are applied can be straightforward. Figure 4-1 presents an example data sheet that can be given to each operator responsible for thinning coatings. The operator only has to enter the identification for the coating, the amount of coating used, the identification and quantity of any catalysts or other additives, and the identification and quantity of any solvent added to the coating. This information can then be entered into a spreadsheet that will automatically calculate the VOC content of the coating as applied. Figure 4-2 presents an example spreadsheet for calculating

Example 1 - Calculating the As-Applied VOC Content of a Coating

Compliance Method - Higher solids sealers and topcoats

VOC content of top coat - 1.5 lb VOC/lb solids, as supplied

Emission limit - 1.8 lb VOC/lb solids, as applied

Coating density - 8.0 lb/gal

Coating solids content - 0.4 (40 percent)

Coating usage - 1,000 gal

Solids used = Density x Gals used x percent solids

= 8.0 x 1,000 x 0.4

= 3,200 lb solids

VOC from as-supplied coating = 1.5 lb VOC/lb solids x 3,200 lb solids

= 4,800 lb VOC

Thinner VOC content - 6.8 lb/gal

Thinner usage - 60 gal

VOC from thinner 6.8 x 60 = 408 lb VOC

VOC from thinner and as supplied coating 4,800 + 408 = 5,208 lb

Solids from as-supplied coating (also equal to solids of as-applied coating because thinner contains no solids) = 3,200 lb

VOC content of as applied coating = 5,208 lb VOC/3,200 lb solids = 1.63 lb VOC/lb solids, as applied.

In this case, the as-applied coating is still compliant, that is, it has a VOC content no greater than 1.8 lb VOC/lb solids, as applied.

the VOC content of a coating that has been thinned. In this case, the facility should maintain copies of the data sheet filled out by the operator and backup copies of the spreadsheet in order to demonstrate compliance.

Table 4-2 summarizes the compliance demonstration requirements for facilities using a compliant coatings approach to comply with the CTG.

Manufacturer	Coating type	Coating serial No.	Coating quantity	Catalyst serial No.	Catalyst quantity	Solvent serial No.	Solvent quantity	Water quantity	Total volume	Operator's Initials

Figure 4-1. Example data sheet for spray booth operators.

Manufacturer	*Coating type*	*Serial No.*	*VOC content, (lb VOC/lb solids) as supplied (A)*	*Density (B)*	*Percent solids, by weight (C)*	*Coating usage, gal*[a] *(D)*	*Solids used, lb*[b] *(E)*	*VOC from coating, lb*[c] *(F)*	*Thinner usage, gal*[a] *(G)*	*Thinner VOC, lb/gal (H)*	*VOC from thinner, lb*[d] *(I)*	*VOC content, (lb VOC/lb solids) as applied coating*[e] *(J)*

[a] *From operator data sheet.*
[b] *Solids used = B x D x (C/100).*
[c] *VOC from as applied coating = A x E.*
[d] *VOC from thinner = G x H.*
[e] *VOC content of as applied coating = (I + F)/E.*

Figure 4-2. Example spreadsheet for calculating as-applied VOC content of coatings.

TABLE 4-2. COMPLIANCE DEMONSTRATION FOR FACILITIES USING COMPLIANT COATINGS

Coating usage scenario	Compliance demonstration requirements
Coatings are used as supplied, that is, no additives or thinners are added to coating.	1. Maintain copies of CPDS.
Coatings are thinned before application	1. Maintain copies of CPDS; and 2. Maintain data sheets showing coating and thinner usage and calculation of as applied VOC content.

4.1.1.1 Compliant Coatings and Continuous Coaters. The CTG includes special compliance provisions for facilities that are using a compliant coatings approach and are applying those coatings using a continuous coater. Continuous coaters are coating application systems that apply the coating onto furniture or furniture parts as they move along on a conveyor. Coating that is not transferred to the part is recycled to the coating reservoir. Facilities may choose between the following two options for demonstrating compliance.

1. Option 1 for demonstrating compliance is basically the same as it is for coatings that are not applied with continuous coaters. Facilities must maintain copies of the CPDS for each coating subject to an emission limit, and, if the coating is subsequently thinned, they must maintain records that demonstrate the VOC content of the as applied coating does not exceed the emission limit for that coating. If an inspector takes a sample of the coating in the reservoir and performs a Method 24 (40 CFR Part 60, Appendix A) analysis of the sample, the coating must have a VOC content no greater than the emission limit for the coating.

2. Under option 2, the facility must monitor the viscosity of the coating in the reservoir. The viscosity of the initial coating in the reservoir must be measured. The facility may then either monitor the viscosity of the coating in the reservoir continuously with a viscosity meter, or they may measure the viscosity each time solvent is added. If, at any time, the viscosity of the coating in the reservoir is less than the viscosity of the initial coating, the facility is out of compliance. The facility must also maintain a record of all

solvent and coating additions to the reservoir. As with option 1, if an inspector takes a sample of the coating in the reservoir, the VOC content must not exceed the emission limit for that coating. However, the VOC content as calculated from the facility's records may exceed the emission limit.

4.1.2 Averaging

The CTG allows averaging to be used as a compliance option, and it provides detailed guidance on how an averaging program works. However, as with all aspects of the CTG, the State and/or local agency may choose to disallow this compliance option. Some States have expressed concern about the additional burden an averaging approach places on their resources. Some have indicated they may allow averaging, but they may place restrictions on it that are not included in the program presented in the CTG. For example, some States may limit the type of coatings that may be included in an averaging program. Facilities that wish to use an averaging program to comply with the CTG should first contact their State or local agency to determine if the State is allowing an averaging approach and, if so, any restrictions that may apply.

Facilities using an averaging approach to comply with the CTG may use one of two equations to demonstrate they are in compliance. The equation the facility chooses to use will depend upon the coatings they would like to average among. Sources that choose to use an averaging approach must demonstrate that emissions from finishing operations at the source are no greater than the emissions that are allowed using either Equation 1 or 2.

$$0.9[0.8(TC_1 + TC_2 + TC_3 + ...)] \geq (ER_{TC1}(TC_1) + ER_{TC2}(TC_2) + ER_{TC3}(TC_3) + ...)$$

(Equation 1)

$$0.9[(1.8(TC_1 + TC_2 + ...)) + (1.9(SE_1 + SE_2 + ...)) + (9.0(WC_1 + WC_2 + ...)) + (1.2(BC_1 + BC_2 + ...)) + (6.6(ST_1 + ST_2 + ...)) \geq (ER_{TC1}(TC_{1)} + ER_{TC2}(TC_2) + ...) + (ER_{SE1}(SE_1) + ER_{SE2}(SE_2) + ...) + (ER_{WC1}(WC_1) + ER_{WC2}(WC_2) + ...) + (ER_{BC1}(BC_1) + ER_{BC2}(BC_2) + ...) + (ER_{ST1}(ST_1) + ER_{ST2}(ST_2) + ...)$$

(Equation 2)

where:

TC_i = pounds of solids of topcoat "i" used;

SE_i = pounds of solids of sealer "i" used;

WC_i = pounds of solids of washcoat "i" used;

BC_i = pounds of solids of basecoat "i" used;

ST_i = gallons of stain "i" used;

ER_{TCi} = VOC content of topcoat "i" in lb VOC/lb solids, as applied;

ER_{SEi} = VOC content of sealer "i" in lb VOC/lb solids, as applied;

ER_{WCi} = VOC content of washcoat "i" in lb VOC/lb solids, as applied;

ER_{BCi} = VOC content of basecoat "i" in lb VOC/lb solids, as applied;

ER_{STi} = VOC content of stain "i" in lb VOC/gal, as applied.

In both equations (1) and (2) the facility must use the actual VOC content of the coatings that were in use before they were subject to RACT if the VOC content of those coatings is less than the allowed VOC content. For example, if you were using topcoats that had a VOC content of 1.7 lb VOC/lb solids before you were subject to RACT, you would have to use 1.7, rather than 1.8, as the multiplier for the topcoat in Equation (2).

The equation a facility chooses to use will be based on the type of low-VOC finishing system that it is using. If a facility has reformulated many of its topcoats so that they have a VOC content lower than 0.8, but there are some topcoats that the facility needs to use for other applications that have a VOC content greater than 0.8, then the facility would use Equation (1). This would allow the facility to continue using the topcoats with a higher VOC content than the emission limit for topcoats. Example 2 illustrates a facility that may want to average among their topcoats and how they would determine they were in compliance using Equation (1).

Some facilities have invested time and money in developing reverse hybrid finishing systems in which the stains and, in some cases, the washcoats are waterborne coatings, but the sealers and topcoats are traditional nitrocellulose coatings. Because the reference control technologies for the CTG are based on lower-VOC topcoats and sealers, these facilities will either have to reformulate their sealers and topcoats also or they will need to comply using an averaging approach. Facilities that have reformulated their color coats rather than their topcoats can use Equation (2) to demonstrate compliance. Example 3 illustrates the averaging procedure for a facility using a reverse hybrid system.

Example 2 - Averaging Topcoats Only for the CTG

Facility Description - Manufacturer of business furniture with two finishing lines. One line is a flatline operation for finishing components of furniture that are assembled after finishing. Coatings are applied using a roll coater. One line is a spray finishing operation for furniture that is assembled and then finished. The facility is using a UV-cured topcoat on the flatline finishing system and an acid-catalyzed topcoat on the spray line. Table 4-3 presents the VOC and solids content and usage for each of the coatings.

TABLE 4-3. COATING PARAMETERS FOR FACILITY AVERAGING TOPCOATS

Coating parameters	UV-cured topcoat	Acid-catalyzed topcoat
VOC content, lb VOC/lb solids	0.1	2.3
Density, lb/gal	9.8	7.6
Solids content, percent by weight	90	30
Usage, gal/d	150	90
Usage, lb solids/d	1,323	205

The facility's allowable emissions are equal to:

$0.9(0.8(1,323 + 205)) = 1,100$ lb VOC/day

The facility's actual emissions are equal to:

$(0.1)(1,323) + (2.3)(205) = 604$ lb VOC/day

Because the facility's actual emissions for the day are less than their allowable emissions they are in compliance with the standard even though one of their topcoats has a VOC content greater than the emission limit of 0.8.

The facility in Example 3 is likely using other coatings in their finishing sequence, but the CTG limits the coatings that can be averaged to those shown in the equation. For example, fillers and highlights cannot be used in the averaging equation. However, the facility does not have to be using all of the coatings listed in Equation (2) to participate in

Example 3 - Averaging for a Facility Using a Reverse Hybrid Finishing System

Facility Description - Manufacturer of medium to high end furniture that has determined that a reverse hybrid system allows them to achieve the overall appearance they are trying for better than a traditional hybrid system where the sealers and topcoats are reformulated. The facility is using waterborne stains and washcoats and conventional nitrocellulose sealers and topcoats. Table 4-4 presents the coating parameters and usage.

TABLE 4-4. COATING PARAMETERS AND USAGE FOR FACILITY USING REVERSE HYBRID FINISHING SYSTEM

Coating	VOC[a]	Density, lb/gal	% solids	Usage[b]
Waterborne stain (includes toner)	0.8	8.4	0.6	308
Waterborne washcoat	0.9	8.5	8.5	50
Sealer	3.9	7.4	20	270
Topcoat	3.4	7.6	23	728

[a]For stains, the VOC content is in units of lb VOC/gal. For other coatings, the VOC content is lb VOC/lb solids. All values are as applied.
[b]For stains, usage is in gallons per day. For other coatings, usage is pounds of solids per day.

Using the above coating parameters and usage ratio, the facility's allowable emissions are equal to:

$$0.9*[(1.8)(728) + (1.9)(270) + (9.0)(50) + (6.6)(308)] = 3{,}876 \text{ lb}$$

The facility's actual emissions are:

$$(3.4)(728) + (3.9)(270) + (0.9)(50) + (0.8)(308) = 3{,}820$$

The facility's actual emissions are slightly lower than the allowable emissions as calculated using Equation (2), so the facility is in compliance with the emission limits.

averaging. For example, in Example 3, the facility is not using basecoats so they are not included in the calculation.

Facilities using an averaging approach must maintain the following records to demonstrate compliance:

- Certified product data sheets for coatings participating in averaging;

- Data sheets showing VOC content of coating as applied; and
- Records of the amount of each coating used.

4.1.3 Add-on Control Devices

The CTG also provides the facility the option of complying with the coating VOC emission limits through the use of an add-on control device. It is anticipated that only a few facilities will choose this option, but it is available. Currently, add-on control devices are being used by only a few facilities, and those are primarily large kitchen cabinet and business furniture manufacturers with automated flatline finishing systems. Controlling traditional wood furniture manufacturing exhaust streams, which are typically high volume, low concentration streams, with add-on control devices is technically feasible but not very cost effective.

The CTG provides guidance on how to demonstrate compliance when using thermal oxidizers, catalytic oxidizers, and carbon adsorbers, but a facility may choose to use another type of control device. Facilities using other types of control devices should work with EPA and the State to develop compliance demonstration requirements for those control devices.

The CTG also recognizes that the overall control efficiency of a control system is a product of the destruction/removal efficiency of the control device and the capture efficiency. The capture efficiency is the ratio of the quantity of pollutants entering the control device to the quantity of pollutants emitted from the emission source. The CTG model rule and the NESHAP identify the methods to be used to determine the capture efficiency initially. Because these methods are somewhat complicated and apply to only a few facilities, they will not be discussed in detail here. Facilities using an add-on control device should review the appropriate sections of the model rule to find out more about these methods.

Facilities using add-on control devices must conduct a performance test to demonstrate the overall control efficiency of the system. During the performance test, they need to establish operating parameter(s) they can monitor that will demonstrate that the control device is continually achieving the required control efficiency. If they cannot establish an operating parameter, they may have to continually monitor VOC emissions at the inlet and outlet of the control device. Table 4-5 presents operating parameters to be monitored for facilities using thermal oxidizers, catalytic oxidizers, and carbon adsorbers.

TABLE 4-5. OPERATING PARAMETERS FOR ADD-ON CONTROL DEVICES

Control device	Operating parameter(s)
Thermal oxidizer	Minimum combustion temperature
Catalytic oxidizer with fixed catalyst bed	Minimum gas temperature upstream and downstream of the catalyst bed
Catalytic oxidizer with fluidized catalyst bed	1. Minimum gas temperature upstream of the catalyst bed; and 2. Pressure drop across the catalyst bed.
Carbon adsorber	1. Total regeneration mass stream for each regeneration cycle; and 2. Carbon bed temperature after each regeneration.

To demonstrate continuous compliance with the standard using a control device, the facility must continuously monitor the operating parameter(s) to demonstrate that the operating parameter(s) are in the range established during the initial performance test.

4.1.4 Combination of Compliance Options

The CTG allows facilities to use any combination of the three options to comply with the standard. Facilities using a combination of compliance methods will have to follow the compliance demonstration requirements for each of the individual compliance methods. For example, a facility may have their emissions from one finishing line directed to an add-on control device, but they may be using compliant coatings on the other finishing line. The facility would have to maintain the records required for demonstrating their coatings are compliant, and they would have to monitor the selected operating parameters of the control device to demonstrate they are achieving the required control efficiency.

4.2 NESHAP COMPLIANCE OPTIONS

The NESHAP also provides three primary options for complying with the emission limits for finishing operations. There are two methods that facilities can use to comply with the emission limits for contact adhesives.

4.2.1 Compliance Options for Finishing Operations

4.2.1.1 Compliant Coatings. Table 2-4 presents the NESHAP emission limits for coatings for both existing and new sources. As shown in the table, the standard limits the VHAP content of all stains, washcoats, sealers, topcoats, basecoats, enamels, and thinners used by a facility. There is no limit on the VHAP content of coatings typically used in

smaller amounts, such as fillers and glazes. With the exception of the emission limit for stains, the emission limits for coatings used by new sources are more stringent than those used by existing sources.

To demonstrate compliance with the NESHAP emission limits for coatings, facilities have to maintain copies of certified product data sheets for each coating, and thinners added to those coatings, subject to an emission limit. If a facility thins the coatings before application, the NESHAP does not require the facility to maintain data sheets showing the amount of thinner added to each batch and the VHAP content of that batch after thinning. However, the emission limits are on an as applied basis so facilities do need to make sure that they are not thinning the coating to the point that the emission limit is exceeded. If an inspector comes in and takes a sample of the coating and it exceeds the limit, the facility will be in violation of the standard even though the CPDS shows the VHAP content of the coating is no greater than the emission limit established for that coating and the thinner the facility used had a VHAP content less than 10.0 percent by weight. Therefore, it is probably in the best interest of the facility to maintain data sheets for calculating the as-applied VHAP content even though it is not required by the NESHAP.

In summary, facilities using a compliant coatings approach to comply with the NESHAP limits for finishing operations are only required to maintain certified product data sheets for each coating subject to an emission limit and any thinners that are added to those coatings.

4.2.1.1.1 Compliant coatings and continuous coaters. As with the CTG, the NESHAP contains special compliance provisions for facilities that are using a compliant coatings approach to comply with the coating emission limits and are applying those coatings with a continuous coater. Facilities may choose between the same two options that are presented in 4.1.1.1 for the CTG. The only difference is that the NESHAP limits the VHAP content of the coating, rather than the VOC content.

4.2.1.2 Averaging. The NESHAP also provides facilities the option of averaging their coatings to meet the standard. Whereas the CTG requires facilities to meet a daily average, the NESHAP gives facilities the flexibility of meeting a monthly average. For existing sources, the average VHAP content for all finishing materials used at the facility during the

month must be no greater than 1.0 lb VHAP/lb solids, as applied. For new sources, the limit is 0.8 lb VHAP/lb solids, as applied. Note that although the compliant coatings approach only requires specific coatings to meet the emission limits, all coatings used at the facility during the month must be included in the averaging equation for the NESHAP.

Both existing and new sources must use the following equation to demonstrate compliance when using an averaging approach:

$$E = (M_{c1}C_{c1} + M_{c2}C_{c2} + ... + M_{cn}C_{cn} + S_1W_1 + S_2W_2 + ... S_nW_n)/(M_{c1} + M_{c2} + ... + M_{cn})$$

Equation (3)

where:

E = average VHAP content of finishing materials (lb VHAP/lb solids);

M_{cn} = the mass of solids in finishing material (c) used monthly (lb solids/month);

C_{cn} = the VHAP content of finishing material (c) in lb VHAP/lb solids;

S_n = the VHAP content, expressed as a weight fraction, of any thinners added to the finishing materials participating in the averaging equation; and

W_n = the amount of S_n, in pounds, added to the finishing materials during the monthly averaging period.

For existing sources, E must be no greater than 1.0 lb VHAP/lb solids. For new sources, E must be no greater than 0.8.

To demonstrate compliance using an averaging approach, a facility must:

1. Maintain certified product data sheets for each finishing material;

2. Maintain records of the amount of each finishing material used each month and the percent solids of that finishing material in order to determine the pounds of solids of each finishing material used;

3. Maintain certified product data sheets for all thinners added to the finishing materials used each month; and

4. Maintain records of the amount of thinners, in pounds, added to the finishing materials during the month.

Example 4 illustrates a facility that has chosen to use an averaging approach to meet the NESHAP emission limits for finishing operations.

Example 4 - Calculations to Demonstrate Compliance for a Facility Using an Averaging Approach to Meet the NESHAP Emission Limits

Facility Description - The facility is a medium sized kitchen cabinet plant using about 60,000 gallons of coating per year, with a basic finishing sequence of stain, sealer, and topcoat. The facility is an existing source, so they must achieve an average emission limit of no more than 1.0 lb VHAP/lb solids, as applied. In order to meet the NESHAP emission limits, they have decided to use sealers and topcoats with slightly higher solids contents, that is, about 35 percent. They have also worked with their coating supplier to try and lower the HAP content of these coatings by using as much as possible non-HAP solvents. The facility has had little success reformulating their stains, however, so they must use an averaging approach to meet the standard. The facility also uses small amounts of thinner, typically lacquer thinner, for their sealers and topcoats. Table 4-6 presents the coating usage and parameters for the facility.

TABLE 4-6. COATING PARAMETERS FOR FACILITY USING AVERAGING APPROACH TO MEET THE NESHAP EMISSION LIMITS FOR FINISHING

Parameters	Stain	Sealer	Topcoat	Thinner
Usage (gal/month)	925	2,000	2,075	60
Density (lb/gal)	6.7	7.8	7.9	6.8
% Solids (by weight)	1.5	35	35	0
Usage (lb solids/month)	93	5,460	5,737	0
VHAP content (lb/gal)	0.1	2.0	1.5	3.4
VHAP content (lb VHAP/lb solids)	45	0.7	0.5	N/A

Using Table 4-6:

$E = ((93)(45) + (5,460)(0.7) + (5,737)(0.5) + (60)(6.8)(0.5))/(93 + 5,460 + 5,737) = 0.98$ lb VHAP/lb solids

Because E is less than 1.0 the facility is in compliance. However, if this facility were a new source, it would not be in compliance.

4.2.1.3 Add-On Controls. Facilities may also use an add-on control device to meet the NESHAP emission limits for finishing operations. As discussed earlier, however, it is anticipated that few facilities will choose to use add-on controls due to the high capital and operating costs that would be incurred. The compliance demonstration requirements for

facilities using add-on control devices to meet the NESHAP emission limits are the same as those for the CTG, which are discussed in 4.1.3. The reader should refer to that discussion to review those requirements.

4.2.1.4 Combination of Compliance Options. The NESHAP allows facilities to use any combination of the three options to meet the emission limits for finishing operations. If using a combination of options, the facility must meet the compliance demonstration requirements associated with each option.

4.2.2 Compliance Options for Gluing Operations

As discussed in Chapter 2, the NESHAP also establishes emission limits for contact adhesives. Facilities using contact adhesives have two options for demonstrating compliance--using compliant contact adhesives, that is, those that meet the emission limits presented in Table 2-4, or using an add-on control device.

4.2.2.1 Compliant Contact Adhesives. Table 2-4 presents the emission limits for contact adhesives for both existing and new sources. There are two categories of contact adhesives for the purposes of this rule: foam adhesives and all other contact adhesives (excluding aerosol adhesives and excluding contact adhesives used on nonporous substrates such as metal, rubber, rigid plastic, or flexible vinyl). For existing sources, the limit is less stringent for foam adhesives due to problems encountered in formulating foam adhesives that pass flammability tests. The compliance demonstration requirements for facilities using compliant contact adhesives are the same as those for facilities using compliant coatings to meet the finishing limits.

If a facility does not thin their contact adhesives onsite, the only requirement for demonstrating compliance is to maintain a certified product data sheet for each contact adhesive. However, if the facility thins their adhesives onsite, they must also maintain data sheets that demonstrate the as-applied VHAP content of the contact adhesive does not exceed the allowable level. Because the limit for contact adhesives varies according to the use of the adhesive, the facility should also maintain a record of how the contact adhesive was used. Table 4-7 summarizes the compliance demonstration requirements for facilities using contact adhesives.

TABLE 4-7. COMPLIANCE DEMONSTRATION FOR COMPLIANT CONTACT ADHESIVES

Adhesive usage scenario	Compliance demonstration requirements
Contact adhesives are used as supplied, that is, no additives or thinners are added to the contact adhesive.	1. Maintain copies of certified product data sheets; and 2. Maintain record of operation for which contact adhesive was used.
Contact adhesives are thinned before application	1. Maintain copies of certified product data sheets; 2. Maintain data sheets showing contact adhesive and thinner usage and calculation of as-applied VHAP content; and 3. Maintain record of operation for which adhesive was used.

4.2.2.2 Add-On Control Devices. The compliance demonstration requirements for facilities using an add-on control device to reduce emissions from the use of contact adhesives are the same as those discussed in 4.1.3 for facilities using a control device to meet the emission limits for finishing operations.

CHAPTER 5

RECORDKEEPING AND REPORTING REQUIREMENTS

This section presents the recordkeeping and reporting requirements for facilities subject to the CTG and/or NESHAP. In general, these requirements will vary according to the method the facility chooses to use to demonstrate compliance.

5.1 RECORDKEEPING REQUIREMENTS

Because many facilities are expected to use a compliant coatings and/or contact adhesives approach to meet the requirements of the CTG and NESHAP, maintaining complete records is particularly important because they allow these facilities to demonstrate compliance. Therefore, many of the recordkeeping requirements discussed in this chapter were also discussed in Chapter 4. However, in addition to the recordkeeping requirements associated with the emission limits and compliance options presented in Chapters 2 and 4, this chapter will also discuss recordkeeping requirements associated with the work practice standards. Because most of the work practice standards are included in both the CTG and NESHAP, the recordkeeping requirements associated with them will be addressed in a separate section to avoid repeating them in the discussion for both the CTG and the NESHAP.

Both the CTG and the NESHAP require facilities to maintain all records for 5 years.

5.1.1 CTG Requirements

Table 5-1 summarizes the recordkeeping requirements associated with each of the compliance options presented in Chapter 4.

Facilities should note that the recordkeeping requirements listed in the table for facilities using an averaging approach represent the minimum requirements. If an individual State chooses to allow averaging, they may have more stringent recordkeeping requirements.

5.1.2 NESHAP Recordkeeping Requirements

As with the CTG, the recordkeeping requirements for the NESHAP are dependent upon the option the facility is using to demonstrate compliance. Table 5-2 summarizes the recordkeeping requirements by compliance option for both finishing and gluing operations. Note that the recordkeeping requirements for the NESHAP are very similar to those for the

TABLE 5-1. RECORDKEEPING REQUIREMENTS FOR THE CTG

Compliance option	Recordkeeping requirements
Compliant coatings	1. Certified product data sheets for each coating subject to the emission limits presented in Chapter 2; and 2. If coatings are thinned, data sheets showing coating and thinner usage and calculation of the as applied VOC content.
Compliant coatings with continuous coaters	<u>Option 1</u> - Same as for compliant coatings. Records must demonstrate that the as-applied VOC content does not exceed the applicable emission limit. <u>Option 2</u> 1. Certified product data sheet for the as-supplied coating; 2. Record of all solvent and finishing material additions to the reservoir; and 3. All viscosity measurements.
Averaging	1. Certified product data sheets for each coating participating in averaging; 2. Data sheets showing coating and thinner usage and calculation of the as-applied VOC content; 3. Records of the amount of coating used per day; and 4. Copies of the averaging calculation.
Add-on control	1. Certified product data sheets for each coating; 2. Copies of calculations demonstrating the equivalency of using a control system; 3. Records of the daily average value of each continuously monitored parameter; and 4. For facilities using a fluidized bed catalytic incinerator, records of the pressure drop across the catalyst bed.
Combination of options	All records required by each of the options.

TABLE 5-2. RECORDKEEPING REQUIREMENTS FOR THE NESHAP

Compliance option	Recordkeeping requirements
Finishing operations	
Compliant coatings	1. Certified product data sheets for each coating and thinner subject to the emission limits presented in Chapter 2; and 2. The VHAP content, in lb VHAP/lb solids, as applied, for each coating subject to the emission limits presented in Chapter 2.
Compliant coatings with continuous coaters	Option 1 · Same as requirements for compliant coatings. Records must demonstrate that the VHAP content does not exceed the applicable emission limit. Option 2 1. Certified product data sheet for each coating and thinner; 2. Record of all solvent and coating additions to the reservoir; and 3. All viscosity measurements.
Averaging	1. Certified product data sheets for each coating participating in averaging; 2. Records of the amount of coating and thinner used each month; 3. Copies of the averaging calculation.
Add-on control device	1. Certified product data sheets for each coating; 2. Copies of calculations demonstrating equivalency of using a control system; 3. Records of the daily average value of each continuously monitored parameter; and 4. For facilities using a fluidized bed catalytic incinerator, records of the pressure drop across the catalyst bed.
Compliant coatings and control device or averaging and control device	Maintain all records required by each individual option.
Gluing Operations	
Compliant contact adhesives	1. Certified product data sheet for each contact adhesive subject to the emission limits presented in Chapter 2; 2. If adhesives are thinned, data sheets showing contact adhesive and thinner usage and calculation of the as applied VHAP content; and 3. Records documenting the process in which the contact adhesive was used.
Add-on control device	1. Certified product data sheet for each contact adhesive subject to the emission limits presented in Chapter 2; 2. Copies of calculations demonstrating the equivalency of using a control system; 3. Records of the daily average value of each continuously monitored parameter; and 4. For facilities using a fluidized bed catalytic incinerator, records of the pressure drop across the catalyst bed.

CTG. This should help minimize the recordkeeping burden for facilities that are subject to both.

5.1.3 Recordkeeping Requirements for Work Practice Standards

Most of the work practice standards are included in the CTG and the NESHAP. The two exceptions are the formulation assessment plan for finishing operations and the limitation on the chemical composition of cleaning and washoff solvents, which are included in the NESHAP but not the CTG. Section 5.1.3.1 summarizes the recordkeeping requirements for the work practice standards that are common to both the CTG and NESHAP, and Section 5.1.3.2 summarizes the recordkeeping requirements associated with the formulation assessment plan and the limitation on the chemical composition of cleaning and washoff solvents.

5.1.3.1 CTG and NESHAP Work Practice Standards. Because the work practice standards are considered a critical element of both the CTG and NESHAP, EPA has included recordkeeping requirements to ensure facilities are implementing these standards. A summary of the recordkeeping requirements associated with the work practice standards that are common to both the CTG and NESHAP is included in Table 5-3.

Facilities are also required to maintain a copy of the work practice implementation plan onsite. The work practice implementation plan should include a copy of the operator training program, the inspection and maintenance plan, the cleaning and washoff solvent accounting system, and for facilities subject to the NESHAP, the formulation assessment plan for finishing operations.

The work practice standards also include requirements for storing materials and for spray gun and line cleaning. One option to ensure these standards are being met is to develop a checklist that a designated employee or supervisor can use to ensure that these work practice standards are being followed. If operators know that plant personnel are performing regular checks, they are more likely to follow the appropriate procedures. An example work practice inspection checklist is included in Chapter 8.

5.1.3.2 Work Practice Standards for the NESHAP Only. As discussed in Chapter 3, the NESHAP includes two work practice standards that are not included in the CTG. These include the formulation assessment plan for finishing operations and the limitation on the

TABLE 5-3. RECORDKEEPING REQUIREMENTS FOR THE CTG AND NESHAP WORK PRACTICE STANDARDS

Work practice standard	Recordkeeping requirements
Operator training program	1. Copy of program, including: - a list of personnel required to be trained; - an outline of the subjects to be covered; and - lesson plans for training courses; 2. Records documenting successful completion of the training program for each individual; and 3. Date each individual was trained.
Inspection and maintenance plan	1. Copies of checklists documenting visual monthly inspection of equipment; and 2. Records demonstrating timeframe for making repairs.
Cleaning and washoff solvent accounting system	1. Record of the quantity and type of organic solvent used each month for washoff and cleaning; 2. Record of the number of pieces washed off and the reason why; and 3. Record of the quantity of spent solvent generated each month by operation and whether it is recycled onsite or disposed offsite.
Spray booth cleaning	VOC content of material used for cleaning spray booths.
Application equipment requirements	Documentation that conventional air spray guns are only being used as allowed, including: - if used for applying low-VOC coatings, records showing that the VOC content is no greater than 1.0 lb VOC/lb solids; - if used for applying small quantities of finishing materials, other than for touchup and repair, records of total finishing material usage and quantity applied with air spray gun.

chemical composition of cleaning and washoff solvents. Both of these work practice standards have recordkeeping requirements associated with them. Table 5-4 summarizes the recordkeeping requirements associated with these two work practice standards.

TABLE 5-4. ADDITIONAL RECORDKEEPING REQUIREMENTS FOR NESHAP WORK PRACTICE STANDARDS

Work practice standard	Recordkeeping requirements
Formulation assessment plan for finishing operations	1. Maintain MSDS for coatings containing VHAP of potential concern; and 2. Maintain usage records for coatings containing VHAP of potential concern.
Limitation on chemical composition of cleaning/washoff solvents	Maintain MSDS for all solvents used for cleaning and/or washoff.

5.2 REPORTING REQUIREMENTS

As with the recordkeeping requirements, many of the reporting requirements are the same for the CTG and the NESHAP. They are also consistent with reporting requirements associated with the Title V Operating Permit Program, which are discussed in Chapter 7. The goal in making the reporting requirements consistent was to minimize the burden on facilities that are subject to the CTG and NESHAP and will be required to obtain a Title V permit.

The reporting requirements for the CTG and NESHAP are discussed separately here because some facilities will not be subject to both. However, facilities subject to both the CTG and NESHAP can include all the required information in one report.

5.2.1 CTG Reporting Requirements

There are two main reporting requirements associated with the CTG: an initial compliance status report and a semiannual continuous compliance report. Table 5-5 summarizes the information that should be included in the initial compliance report. Facilities are required to submit the initial compliance report within 60 days of the compliance date, which, for the CTG, will vary between States.

Table 5-6 summarizes the information that should be included in the semiannual compliance status reports for the CTG. The first semiannual report, which should cover the

TABLE 5-5. INFORMATION INCLUDED IN INITIAL COMPLIANCE REPORT FOR CTG

Compliance method	Information included in report
Compliant coatings	Statement that the facility is using compliant sealers and/or topcoats and strippable booth coatings.
Compliant coatings with continuous coaters	1. Statement that the facility is using compliant sealers and/or topcoats, as determined by the VOC content of the coating in the reservoir and the VOC content calculated from records; or 2. Statement that the facility is using compliant sealers and/or topcoats, as determined by the VOC content of the coating in the reservoir, and the facility is monitoring the viscosity of the coating in the reservoir; and 3. Data demonstrating the correlation between the VOC content of the coating in the reservoir and the viscosity of the coating.
Averaging	The CTG does not designate specific information that must be included in the initial compliance status report. A facility using an averaging approach should work with their permitting authority to determine what information should be included.
Add-on controls	1. Monitoring plan that identifies each operating parameter to be monitored for the control device; and 2. Results of the initial performance test.
Compliance with work practice standards	Statement that the work practice implementation plan has been developed and the facility has established procedures for implementing the provisions of the plan.

TABLE 5-6. INFORMATION TO BE INCLUDED IN SEMIANNUAL COMPLIANCE STATUS REPORTS FOR THE CTG

Compliance method	Information to be included in report
Compliant coatings	Statement that compliant sealers and/or topcoats and strippable booth coatings have been used each day in the reporting period. If noncompliant coatings have been used, the report should identify the days of noncompliance and the reasons.
Compliant coatings with continuous coaters	1. Statement that compliant sealers and/or topcoats, as determined by the VOC content of the coating in the reservoir and the VOC content as calculated from records, have been used each day in the semiannual period. If noncompliant coatings have been used, the report should identify the days of noncompliance and the reasons; or 2. Statement that compliant sealers and/or topcoats, as determined by the VOC content of the coating in the reservoir, have been used each day in the reporting period, and the viscosity of the coating in the reservoir has not been less than the viscosity of the initial coating. If noncompliant coatings have been used or the viscosity of the coating in the reservoir has exceeded the viscosity of the initial coating, the report should identify the days of noncompliance and the reasons why.
Averaging	The CTG does not designate specific information that should be included in the compliance status report. The facility should work with their permitting authority to identify information to be included in the report.
Add-on control device	Statement that the facility has not operated the capture or control device at a daily average value greater than or less than (as appropriate) the operating parameter value.
Compliance with work practice standards	Statement that the work practice implementation plan is being followed, or, if any provisions of the plan have not been followed during the reporting period, a description of the violation and the time period during which it occurred.

previous 6 months of wood furniture manufacturing operations, must be submitted within 30 calendar days of the end of the first 6-month period following the compliance date. Subsequent reports must be submitted within 30 calendar days of the end of the previous 6-month reporting period.

The semiannual compliance status report must be signed by a responsible official of the company that owns or operates the facility. A responsible official can be any of the following:

- The president, vice-president, secretary, or treasurer of the company that owns the plant;

- The owner of the plant;

- The plant engineer or supervisor;

- A government official if the plant is owned by the Federal, State, City, or County government; or

- A ranking military officer if the plant is located on a military base.

5.2.2 NESHAP Reporting Requirements

The reporting requirements for the NESHAP are essentially the same as those for the CTG. The facility must submit an initial notification no later than 270 days after promulgation of the rule. The initial notification report gives the permitting authority an idea of how many facilities will be subject to the NESHAP. The facility must also submit an initial compliance status report and semiannual continuous compliance status reports. Table 5-7 summarizes the information that should be included in the initial compliance report. The initial compliance report must be submitted no later than 60 days after the compliance date. Appendix G contains example initial notification and initial compliance report forms.

The first semiannual compliance status report must be submitted no later than 30 calendar days after the end of the first 6-month period following the facility's compliance date. Subsequent reports must be submitted no later than 30 calendar days after the end of each 6-month period. Table 5-8 summarizes the information to be included in the semiannual compliance status reports for the NESHAP.

As with the semiannual continuous compliance status report required by the CTG, the NESHAP status report must be signed by a responsible official of the company that owns or

TABLE 5-7. INFORMATION TO BE INCLUDED IN INITIAL COMPLIANCE REPORT FOR THE NESHAP

Compliance method	Information to be included in report
Compliant coatings/contact adhesives	Statement that the facility is using compliant coatings, thinners, and/or contact adhesives.
Compliant coatings with continuous coaters	1. Statement that the facility is using compliant coatings, as determined by the VHAP content of the coating in the reservoir and the VHAP content as calculated from records, and compliant thinners; or 2. Statement that the facility is using compliant coatings, as determined by the VHAP content of the coating in the reservoir, and compliant thinners and that they are monitoring the viscosity of the coating in the reservoir; and 3. Data demonstrating relationship between the viscosity of the coating in the reservoir and the VHAP content of the coating.
Averaging (coatings only)	Results of averaging calculation for the first month, starting the first day of the month following the compliance date.
Add-on control device	1. Monitoring plan that identifies each operating parameter to be monitored for the capture device; and 2. Results from initial performance test.
Compliance with work practice standards	Statement that the facility has developed a work practice implementation plan and has established procedures for implementing the provisions of the plan.

TABLE 5-8. INFORMATION TO BE INCLUDED IN THE SEMIANNUAL COMPLIANCE STATUS REPORT FOR THE NESHAP

Compliance with emission limits for coatings/contact adhesives	Information to be included in report
Compliant coatings and/or contact adhesives	Statement that the facility has used compliant coatings, thinners, and/or contact adhesives each day during the reporting period. If noncompliant coatings, thinners, or contact adhesives have been used during the reporting period, the facility should identify when the coatings/thinners/adhesives were used and the reasons why.
Compliant coatings with continuous coaters	1. Statement that the facility has used compliant coatings, as determined by the VHAP content of the coating in the reservoir and the VHAP content of the coating as calculated from records, and compliant thinners each day during the reporting period; or 2. Statement that the facility has used compliant coatings, as determined by the VHAP content of the coating in the reservoir, and compliant thinners each day in the reporting period and that the viscosity of the coating in the reservoir has not been less than the viscosity of the initial coating.
Averaging (coatings only)	Results of the averaging equation for each month within that semiannual period.
Add-on control device	Statement that the facility has not operated the capture or control device at a daily average value greater than or less than (as appropriate) each operating parameter value.
Compliance with work practice standards	Statement that the work practice implementation plan is being followed, or, if any provisions of the plan have not been followed during the reporting period, a description of the violation and the time period during which it occurred.

operates the facility. Appendix G contains an example semiannual continuous compliance status report form. Also, please refer to Table 1 of the NESHAP (see Appendix F) for the reporting requirements of the General Provisions (40 CFR 63, Subpart A).

CHAPTER 6

AVAILABLE CONTROL TECHNOLOGIES

This section presents an overview of control technologies that can be used by wood furniture manufacturing facilities to meet the requirements of the CTG and/or NESHAP. Because of the variety of products manufactured by the wood furniture industry and the range of performance and appearance requirements for those products, there is no one control technology that can be used by all facilities to reduce emissions. The "best" control technology for a kitchen cabinet plant is probably not the "best" control technology for a plant manufacturing higher end residential furniture. It may not even be the best control technology for another kitchen cabinet plant. However, both the CTG and NESHAP recognize the diversity of the industry. They do not mandate the use of a particular control technology. Instead, the CTG and NESHAP allow facilities to choose the option best suited to their operations as long as they can demonstrate they are achieving a level of control equivalent to that required by the standards.

There are two basic options that facilities can use to meet the requirements of the CTG and/or NESHAP. These options include reformulating some or all of their coatings so that they contain less VOC and/or HAP or using an add-on control device to reduce emissions. Because typical wood furniture emission streams are low concentration, high volume streams, add-on control devices have been used only in a limited number of cases in the wood furniture industry. While a brief discussion of add-on control devices is included in this chapter, the focus will be on reformulated coatings.

6.1 REFORMULATED COATINGS

There are two basic types of reformulated coatings that can be used by the wood furniture industry to reduce VOC and VHAP emissions: waterborne coatings and higher solids coatings. Because the NESHAP restricts only the VHAP content of coatings, facilities may also choose to use another type of reformulated coating that will reduce VHAP emissions but not VOC emissions. For lack of a better term, these coatings will be referred to as solvent substituted coatings in this discussion.

6.1.1 Waterborne Coatings

Although waterborne coatings are typically higher solids coatings than the traditional nitrocellulose lacquers used by many wood furniture manufacturers, they can be distinguished from other higher solids coatings by the fact that some portion of the solvent is water. All types of coatings can be reformulated as waterborne coatings. Waterborne stains, washcoats, sealers, and topcoats are available. Some plants use a complete waterborne system, while others have reformulated only some of their coatings and are using either a hybrid or a reverse hybrid waterborne finishing system. In a hybrid waterborne system, the topcoat may be a waterborne coating or the sealer and topcoat may both be waterborne coatings. In a reverse hybrid system, the stains and toners, and sometimes the washcoats, are waterborne coatings.

It is difficult to identify the advantages and disadvantages of waterborne coatings, because the advantages and disadvantages may be different depending upon the type of coating to which the waterborne coatings are compared. For example, waterborne coatings have the advantage of being more durable and having better chemical resistance than the traditional nitrocellulose lacquers used by most residential furniture manufacturers. However, compared to conversion varnishes, which are used extensively by the kitchen cabinet industry because of their durability and resistance to chemicals, the durability and chemical resistance of waterborne coatings may be a disadvantage. The inability of waterborne coatings to rewet and their poor workability are disadvantages when compared to nitrocellulose lacquers, but conversion varnishes present some of the same problems.

The cost of converting to waterborne finishes can be significant. The total cost to the facility will depend upon how many finishing steps are reformulated to waterborne. Facilities converting to waterborne coatings may have to make a significant capital investment. Equipment that may be required includes:

- Passivated stainless steel transfer lines and mix tanks;
- Storage building to replace outdoor bulk storage; and
- Ovens to facilitate drying of the coating.

In summary, the advantages of waterborne coatings include:

- Low VOC and VHAP content;
- Better durability and chemical resistance than nitrocellulose lacquers; and
- Possibly lower insurance costs for the facility.

Disadvantages of waterborne coatings include:

- Slower drying time;
- Cost;
- Clarity of finish; and
- Workability/repairability.

As discussed in Chapter 2, one of the reference control technologies for the CTG is the use of waterborne topcoats with a VOC content no greater than 0.8 lb VOC/lb solids, as applied. If all of a facility's topcoats are waterborne coatings with a VOC content no greater than 0.8 lb VOC/lb solids, as applied, they are in compliance with the CTG. If a facility wished to use a reverse hybrid finishing system, they would have to average their emissions to demonstrate they are achieving the required emission reduction. Chapter 4 includes an example of a facility using a reverse hybrid system and an averaging approach to comply with the requirements of the CTG.

Waterborne coatings can also be used to meet the NESHAP emission limits for finishing. A facility could reformulate all of their coatings that are subject to an emission limit under the NESHAP to waterborne coatings and likely be able to meet the emission limit of 1.0 lb VHAP/lb solids, as applied, (0.8 lb VHAP/lb solids, as applied, for new sources). However, a facility will probably not have to reformulate all of their coatings to waterborne coatings in order to meet the NESHAP emission limits. Because the NESHAP allows facilities to average their emissions across coatings, a facility may use a combination of waterborne coatings and traditional solventborne coatings to meet the average emission limit of 1.0 lb VHAP/lb solids, as applied (0.8 lb VHAP/lb solids for new sources).

Table 6-1 presents scenarios in which waterborne coatings can be used to meet the CTG and/or NESHAP emission limits for coatings.

TABLE 6-1. USING WATERBORNE FINISHING SYSTEMS TO MEET THE CTG AND NESHAP EMISSION LIMITS

Finishing system	Comply with CTG?	Comply with NESHAP?
Hybrid waterborne		
-Topcoat only	Yes	No[a]
-Sealer & topcoat	Yes	Maybe[b]
Reverse hybrid	Maybe[c]	Maybe[b]
Full waterborne	Yes	Yes[d]

[a]To comply with the NESHAP, all major coatings must have a VHAP content no greater than 1.0 lb VHAP/lb solids, as applied (0.8 lb VHAP/lb solids for new sources) or the average across all coatings must be no greater than 1.0 (0.8 for new sources). If the facility were using waterborne topcoats and the other coatings were conventional coatings, which would probably not meet the emission limit, the facility would not be in compliance with the NESHAP. They could try to use an averaging approach, but with all coatings besides the topcoat being conventional coatings, they would probably not meet the limit.

[b]As with the facility using waterborne topcoats only, the other coatings would likely not meet the limit of 1.0 (or 0.8 for new sources) so the facility could probably not comply using a compliant coatings approach. However, with waterborne sealers and topcoats (or in the case of the reverse hybrid system, waterborne stains and washcoats), the average VHAP content across all of the facility's coatings may be less than 1.0 (or 0.8 for new sources), so they may be able to comply using an averaging approach.

[c]Because the reference control technologies are based on reformulated topcoats or reformulated sealers and topcoats, the facility would have to use an averaging approach to comply with the CTG. The facility would have to demonstrate that their emissions are no greater than 90 percent of what they would be using one of the reference control technologies.

[d]Even with a full waterborne system, it is possible the facility would have to use an averaging approach rather than a compliant coatings approach to comply with the NESHAP. Some waterborne stains may not have a VHAP content less than 1.0 lb/lb solids.

6.1.2 Higher Solids Coatings

Many types of coatings can be considered higher solids coatings. The acid-catalyzed coatings used by business furniture and kitchen cabinet manufacturers are higher solids coatings when compared to the nitrocellulose lacquers used by residential furniture manufacturers. However, the solids content of the acid-catalyzed coatings is low in comparison to the solids content of ultraviolet (UV)-cured coatings. This discussion will focus on higher solids coatings that meet the CTG limits for higher solids sealers and topcoats.

6.1.2.1 UV-Cured Coatings. Many segments of the wood furniture industry are using UV-cured coatings. These coatings cure via polymerization when exposed to UV radiation. The final film is very resistant to chemicals and scratching. While the final film provides excellent durability, some manufacturers consider the finish too glossy. Ultraviolet-cured coatings have a very low VOC and VHAP content, with solids contents ranging from 85 to 100 percent. These coatings easily meet the CTG limits for higher solids sealers and topcoats and the even more stringent limits for waterborne topcoats. To date, UV-cured coatings have been used primarily in flatline finishing systems where all surfaces of the pieces to be finished can be easily exposed to UV radiation. However, the use of 3-D UV-curing systems, which can be used on conventional spray lines, is increasing.

In summary, UV-cured coatings have the following advantages:

- Finish has excellent durability and is resistant to chemicals and scratching;
- Curing is rapid so finished pieces can be stacked almost immediately; and
- Very low VOC and VHAP content, up to 100 percent solids.

Disadvantages of UV-cured coatings include:

- Finish is considered to be too glossy;
- Problems still exist in finishing 3-D pieces; and
- Finish cannot be spot repaired.

As discussed earlier, UV-cured coatings easily meet the emission limits established for the CTG. Because the NESHAP limits the VHAP content of the color coats also, facilities using UV-cured topcoats would also have to reformulate their color coats if they wanted to

use a compliant coatings approach to meet the NESHAP limits. However, these facilities could use UV-cured topcoats and use an averaging approach to meet the NESHAP limits.

6.1.2.2 Polyester/Polyurethane Coatings. Polyester and polyurethane coatings are both being used in the wood furniture industry. To date, however, their use has been fairly limited.

There are two types of polyester finishes being used by the wood furniture industry: styrene-derived polyester coatings and acrylic polyesters. Both types of coatings cure through either a catalytic reaction or exposure to UV radiation. Both types of coatings have very low VOC and VHAP contents. The styrene-derived coatings are typically 100 percent solids and the acrylic polyesters are approximately 80 percent solids. Although the styrene-derived polyesters are approximately 100 percent solids coatings, some styrene may not cross-link and may be emitted during the curing process.

Polyester finishes provide good build and good chemical-, mechanical-, and heat resistance. However, because they are difficult to repair, it may be necessary to install a clean room to minimize dust. The coatings also have a short pot life.

Polyurethane coatings also cure through a catalytic reaction. They have many of the same advantages and disadvantages of polyester coatings. The finish is durable and provides good chemical and mechanical resistance. As with polyester coatings, however, a clean room may be required. The VOC content of polyurethane coating varies greatly, ranging from 0.25 to 2.3 lb VOC/lb solids, as applied. Therefore, some would meet the CTG emission limits and some would not.

Polyurethane finishes are based on polyisocyanates. The film is formed by the polymerization of diisocyanate monomers. While these monomers are not toxic like monoisocyanates, facilities may have to equip their workers with supplied-air respirators. In addition, workers should wear safety glasses and permeation-resistant gloves.

In summary, polyester and polyurethane coatings offer some of the same advantages and disadvantages. Advantages include:

- Durable finish with good chemical and mechanical resistance; and
- In most cases, a low VOC and VHAP content.

Disadvantages include:

- Difficulty of repair--a clean room environment may be required;

- The finish may be too glossy;

- Facilities subject to the NESHAP using styrene-derived polyester coatings will have to track their styrene emissions under the formulation assessment plan; and

- Additional worker protection is required for facilities using polyurethane coatings.

6.1.2.3 Higher Solids Nitrocellulose Lacquers. Several wood furniture coating suppliers have developed higher solids nitrocellulose coatings. In terms of finish appearance and durability, these coatings offer the same advantages and disadvantages of conventional nitrocellulose lacquers. The solids contents of these coatings ranges from 30 percent to 50 percent by weight. They meet the CTG emission limits for higher solids sealers and topcoats. Advantages of these coatings include:

- Low VOC and VHAP content; and

- Appearance is comparable to finish with conventional nitrocellulose lacquers.

Disadvantages include:

- Potential increase in drying time; and

- Cost. (The facility has to purchase special application equipment.)

6.1.2.4 Summary of Higher Solids Coatings. All of the higher solids coatings discussed here can be used to meet the CTG emission limits. In some cases, the facility will only have to reformulate their topcoats, because the coatings have a VOC content less than 0.8 lb VOC/lb solids, as applied. For some of the finishing systems, the facility will have to reformulate their sealers and topcoats to meet the limits of 1.9 lb VOC/lb solids and 1.8 lb VOC/lb solids, respectively.

Facilities can also use these higher solids coatings to help meet the NESHAP emission limits. However, in most cases, they would also have to reformulate their color coats, particularly, if they wanted to use a compliant coatings approach to comply with the NESHAP. In some cases, the VHAP content of the reformulated clear coats may be low enough that the facility can use an averaging approach to comply with the NESHAP without reformulating their color coats.

6.1.3 Solvent-Substituted Coatings

The NESHAP only limits the VHAP content of coatings. Facilities that are not subject to the CTG do not necessarily have to use lower VOC coatings to meet the NESHAP emission limits; they only have to use lower VHAP coatings. While some VOC are VHAP, many are not. Therefore, wood furniture manufacturers can choose to meet the NESHAP emission limits by substituting non-VHAP solvents for solvents that are VHAP. For example, methanol, a VHAP, is commonly used as a solvent in stains. In some cases, ethanol, which is not a VHAP, may be substituted for some or all of the methanol.

It is difficult to foresee the advantages or disadvantages of using this approach to meet the NESHAP emission limits, because this is an option that is just beginning to be investigated. One potential disadvantage is that the list of 189 HAP's may change. Facilities may reformulate their coatings with a solvent that is later added to the list. However, chemicals cannot be added to the list without extensive review, so industry will have advance notice of any potential changes. In addition, the NESHAP includes specific language addressing this issue. If chemicals are added to the list, the emission limits will likely be adjusted upward or facilities will be given additional time to meet the limit. One advantage is likely the cost of solvent substitution versus reformulating to waterborne coatings or higher solids coatings. There will undoubtedly be some cost in substituting solvents, but it is likely to be less than moving to either waterborne coatings or most of the higher solids coatings.

6.1.4 Using a Combination of Reformulated Coatings

The reality is that many facilities will likely choose to use a combination of reformulated coatings to meet the CTG and/or NESHAP emission limits. A facility may find that waterborne topcoats work fine for one product line, but they need to use higher solids sealers and topcoats on another product line. To meet the NESHAP emission limits, a facility may move to higher solids sealers and topcoats and use solvent-substituted stains. The CTG and NESHAP both provide facilities the flexibility to use any of the reformulated coatings discussed earlier, or a combination of these reformulated coatings.

6.2 ADD-ON CONTROL DEVICES

As discussed earlier, most facilities are expected to use reformulated coatings to meet the CTG and/or NESHAP emission limits. The use of add-on control devices will likely continue to be limited to large facilities with automated flatline finishing systems. In general, these are the only operations for which the use of add-on controls is cost effective. Therefore, this section will only provide a brief description of the types of add-on controls available.

6.2.1 Oxidizers

Oxidizers destroy VOC's by converting them to carbon dioxide (CO_2) and water. There are two main types of oxidizers available for controlling emissions from wood furniture finishing operations: thermal oxidizers and catalytic oxidizers.

6.2.1.1 Thermal Oxidizers. Thermal oxidizers heat the waste gas stream to an adequate temperature and hold the stream at that temperature for a sufficient time to oxidize the organic compounds in the waste gas stream. Primary components of a thermal oxidization unit are a fan, a heat recovery device, a combustion chamber, and an exhaust stack. The heat recovery device preheats the incoming waste stream in order to minimize the auxiliary fuel requirements in the combustion chamber. Well designed and operated thermal oxidizers can destroy more than 98 percent of the organics present in the waste stream.

It is technically feasible to control both VOC and VHAP emissions from wood furniture finishing operations with a thermal oxidizer. The compounds present in wood furniture exhaust streams (aromatic hydrocarbons, ketones, acetates, and alcohols) can be readily converted to CO_2 and water with a thermal oxidizer. However, the costs associated with control of a dilute air stream can be very high due to supplemental fuel requirements. That is why thermal oxidizers are currently being used primarily on automated, flatline finishing systems. Because worker exposure is not as much of an issue with automated finishing systems, the air flows are much lower so the exhaust stream is more concentrated.

In summary, the only real advantage of thermal oxidizers is that they can achieve a significant reduction, at least 98 percent, in both VOC and VHAP emissions. The primary disadvantage is the cost.

6.2.1.2 Catalytic Oxidizers. Catalytic oxidizers are similar to thermal oxidizers. However, with catalytic oxidation, the oxidation temperature is considerably lower because a catalyst is used to promote oxidation. Platinum is the most commonly used catalyst. Components of a catalytic oxidation unit include a fan, a preheat burner, a combustion mixing chamber, a catalyst chamber, a waste gas preheater, and secondary heat recovery.

It is technically feasible to use catalytic oxidation to control emissions from wood furniture finishing operations. However, there are some technical issues involved with catalytic oxidizers that are not issues with thermal oxidizers. A constant gas flow rate and concentration is recommended for optimal operation of catalytic oxidizers. Wood furniture exhaust streams vary in both composition and concentration. In addition, the presence of particulate matter in wood furniture exhaust streams can poison the catalyst and reduce the catalyst life. This particulate matter would have to be removed using filtration. Of the dozen or so oxidizers currently being used by wood furniture manufacturers, only one is a catalytic oxidizer. All the others are thermal oxidizers.

6.2.2 Carbon Adsorbers

With a carbon adsorber, the VOC in the waste gas stream are adsorbed onto an activated carbon bed. The collected compounds can then be recovered, if desired, by desorbing the bed with steam or hot air. This desorption process is known as regeneration. After regeneration, the VOC can be condensed and recovered or disposed of. Alternatively, if hot air is used for regeneration, the VOC can be sent to an oxidizer for destruction.

The components of a fixed-bed, regenerable carbon adsorption system include a fan, at least two fixed-bed carbon adsorption vessels, a steam valve for introducing desorbing steam, a condenser for the steam/contaminant desorbed stream, and a decanter for separating the VOC condensate and water. If hot air is used for regenerating the bed, a condenser and decanter are not required. The air stream could be sent to an oxidizer for final destruction of the VOC.

Carbon adsorption is technically feasible for controlling wood furniture exhaust streams. Well-designed and operated carbon adsorbers can achieve a recovery efficiency of 95 percent. However, carbon adsorption followed by steam regeneration and subsequent condensation is not a good choice for controlling VOC emissions from most wood furniture

finishing operations because of the number of different types of solvents that are present in most wood furniture exhaust streams. Condensing and distilling many different solvents is complicated, and the purity of such distilled solvents limits their use. Carbon adsorption followed by hot air regeneration is a more practical solution for wood furniture exhaust streams. The air stream can then be sent to an oxidizer where the VOC are destroyed. While this may seem more expensive than using an oxidizer only, in some cases it is not. The air stream from the carbon bed is concentrated, so a smaller oxidizer can be used. The more concentrated air stream also has a higher heating value, so that less auxiliary fuel is required.

CHAPTER 7

OVERVIEW OF THE TITLE V OPERATING PERMIT PROGRAM

7.1 BACKGROUND

The 1990 Clean Air Act Amendments established a new permit program for stationary sources. The program is included in Title V of the Clean Air Act, so the permits required by this program are often known as Title V permits. They are also referred to as operating permits.

The purpose of the Title V permit program is to provide a mechanism for combining all of a facility's air emission requirements and limitations into one permit. Currently, facilities may have a number of different permits that pertain to their air emissions or limitations on those emissions. This chapter will present a brief overview of the Title V operating permit program, particularly as it relates to the CTG and NESHAP.

7.2 INFORMATION TO BE INCLUDED IN AN OPERATING PERMIT

While the requirements may vary slightly from State to State, the following information must be included in each permit:

- Basic facility information, e.g., location, SIC code, legal owner, plant contact;
- Process and product descriptions;
- Emission points, emission rates, and pollutants;
- Control devices, other control measures;
- All applicable State and Federal requirements; and
- Compliance plan and certification.

Applicable State and Federal requirements include any new source performance standards (NSPS) or NESHAP to which the source may be subject and any RACT or BACT requirements. However, there will be facilities that, even though they are major sources, will not be subject to any State or Federal requirements. These facilities will still have to have a permit, but all they will have to do is report their emissions on a regular basis. These permits are referred to as "hollow permits". Even sources that will be subject to the wood furniture NESHAP will likely not have these requirements included in their first permit application, because the compliance date for the NESHAP is not until November 1997 or December 1998

depending on the facility's total emissions. However, the application should include a statement that the source will meet any requirements that become effective during the permit period.

7.3 REPORTING REQUIREMENTS ASSOCIATED WITH THE OPERATING PERMIT

The Title V operating permit program requires facilities to submit a compliance certification annually, unless the facility is subject to a Federal or State requirement that requires sources to submit a report more often. The semiannual compliance status reports required by both the CTG and NESHAP are consistent with this requirement. These reports have to be submitted twice a year rather than once a year, but the information requirements are the same as those associated with the operating permit program requirements.

7.4 RELATIONSHIP TO THE CTG AND NESHAP

Sources that are subject to the NESHAP will have to obtain a Title V operating permit. Many of the sources subject to the CTG will also have to obtain a Title V operating permit, but there may be some that will not. The applicability limit for the CTG is 25 tons of VOC per year, unless the source is located in an extreme nonattainment area. However, the major source designations for VOC emissions are higher than 25 tons per year in serious, moderate, and marginal nonattainment areas and in the ozone transport region. For sources in moderate and marginal nonattainment areas, the cutoff is 100 tons per year. Therefore, sources in these areas emitting between 25 tons and 100 tons of VOC per year would be subject to the CTG, but they would not be considered major sources based on their VOC emissions. The major source designation cutoff in serious nonattainment areas and in the ozone transport region is 50 tons of VOC per year. Therefore, sources in these areas emitting between 25 and 50 tons of VOC per year would be subject to the CTG, but they would not be major sources based on their VOC emissions. In both cases, these facilities would not have to obtain a Title V permit, unless they were also subject to the NESHAP. Wood furniture facilities can use Table 7-1 as a guide for determining if they are required to obtain a Title V permit.

7.5 TIMEFRAME FOR SUBMITTING AN APPLICATION FOR A PERMIT

TABLE 7-1. WOOD FURNITURE FACILITIES REQUIRED TO OBTAIN A TITLE V PERMIT

Scenario	Title V Permit Required?
Subject to the NESHAP	Yes
1. Subject to the CTG; and 2. Located in a severe or extreme nonattainment area.	Yes
1. Subject to the CTG; 2. Located in a serious nonattainment area or the ozone transport region; and 3. Potential VOC emissions are greater than 50 tons per year.	Yes
1. Subject to the CTG; 2. Located in a serious nonattainment area or the ozone transport region; and 3. Potential VOC emissions are less than 50 tons/yr.	No[a]
1. Subject to the CTG; 2. Located in a marginal or moderate nonattainment area; and 3. Potential VOC emissions greater than 100 tons/yr.	Yes
1. Subject to the CTG; 2. Located in a marginal or moderate nonattainment area; and 3. Potential VOC emissions less than 100 tons/yr.	No[a]

[a]A Title V operating permit will be required if the facility is subject to the NESHAP.

The date for submitting an application for a Title V operating permit will vary from State to State, and in some cases, within different areas of the State. While Part 70 of the Code of Federal Regulations (CFR), which includes the regulations developed in response to Title V, provides clear timelines for the permitting process, both the States and EPA have fallen behind in meeting these dates. Table 7-2 presents the schedule for the permit program included in Part 70.

TABLE 7-2. ORIGINAL SCHEDULE FOR THE TITLE V PERMIT PROGRAM

Permit Program Activity	Scheduled Date
State submits permit program to EPA for approval	November 1993
EPA approves permit program	November 1994
Facility submits permit application	No later than November 1995
Final action on permit applications by State	Not to exceed three years; State must act on 1/3 of applications each year.

Some States are close to following this schedule. They submitted their permit programs on time and have received approval from EPA. Some are even requiring facilities to submit their permit applications earlier than November 1995, in order to avoid being deluged with applications at that time.

However, there are many more States that have not yet received approval of their permit programs. A few have not even submitted their permit programs to EPA. Therefore, many facilities will not have to submit their permit applications until after November 1995. **In summary, facilities should contact their permitting authority (State or local agency) to determine the date by which they will be required to submit their permit application**.

CHAPTER 8

DEVELOPING A POLLUTION PREVENTION PROGRAM AT YOUR FACILITY

This chapter addresses the steps a facility should take in developing a pollution prevention program to reduce emissions to the air. However, facilities are encouraged to develop a multimedia waste reduction program that addresses methods for reducing solid waste, energy usage, and raw material usage. The U. S. Environmental Protection Agency and the Tennessee Valley Authority have produced a manual entitled "Wood Furniture Waste Reduction Opportunities" that offers a guide to multimedia waste reduction opportunities from all areas of the wood furniture manufacturing process. The manual is available from the EPA's Center for Environmental Research Information [(513) 569-7391].

While the focus of this chapter is on pollution prevention practices that facilities can implement to reduce air emissions, many of these practices also have other beneficial impacts such as reducing worker exposure to solvents and reducing the use of raw materials.

8.1 WHERE DO I START?

While the answer to this question may vary from one facility to another, the following basic steps should serve as a good starting point.

1. Getting a Commitment

Keys to success for this step include:

- Obtaining a commitment from management to support the program, including a commitment of resources;

- Obtaining a commitment from plant engineers/department supervisors to oversee the program;

- Educating the operators concerning the benefits of the program and the importance of their role; and

- Obtaining a commitment from the operators.

2. Forming a Committee

The next step is to form a committee to evaluate each area of the facility's operations to determine where pollution prevention practices can be instituted. The committee should

include representatives from all operations, including lumber receiving/drying, rough end, assembly, finishing, packing and shipping, and maintenance. This ensures the committee has members with expertise in each area, but it also accomplishes another objective. Many times it is difficult for people to see the obvious in areas where they work every day, but they provide fresh eyes that instantly recognize pollution prevention opportunities in other areas of the plant. The committee should also include upper management representatives, department supervisors, and operators. If possible, committee members should be volunteers. Someone who is forced to serve on the committee is less likely to be committed to achieving the committee's goals than someone who has volunteered. In order to ensure volunteers are available, management should make sure that department supervisors and operators are allowed time away from their other obligations to work with the committee.

Keys to success for this step include:

- Including upper management, plant engineers/department supervisors, and operators on the committee;
- Including representatives from each area of operation;
- Having volunteers rather than draftees serve on the committee; and
- Allowing committee members time away from their other obligations to participate in committee activities.

3. Assessing Each Area of Operation

As a group, the committee should walk through each area of plant operations, asking questions of people working in those areas as needed. As they walk through, they should take notes on what they see and any ideas that they may have. The committee should then meet to discuss their ideas as a group, focusing on each area of operation. From this meeting, they should develop a list of ideas they believe should be explored further. The committee can then either present these ideas as recommendations to management, or they may decide they should discuss them with the individual department supervisors before making a recommendation to management.

Keys to success include:

- Willingness of committee members to ask questions as they conduct the walk through;

- Willingness of committee members to present ideas in followup committee meeting; and

- Consolidating ideas into a concise list of recommendations that can be presented to management.

4. Reporting Back to Management

As a group, the committee should report back to management at this time to present their recommendations based on the facility assessment. While the recommendations may include specific pollution prevention practices the committee believes should be implemented, it is likely that the recommendations will be more general ideas such as the committee believes they are ready to begin development of a pollution prevention plan or they feel a more detailed assessment is needed before developing the plan.

The real key to success for this stage is the willingness of all committee members to be honest with management. If they have seen one area of operation that seems to have extensive problems and needs major improvements, they should be willing to communicate this information. They also should be willing to put forth ideas, not just criticisms.

5. Detailed Assessment of Pollution Prevention Practices

During the preliminary assessment of each area of operation, it is likely that the committee identified several ideas for pollution prevention practices that could be implemented in each area. The committee should follow up on these ideas with a more detailed investigation. At this time, the committee may split up into smaller groups with each group responsible for one area. This should increase their productivity. They may also want to bring in more expertise from each area to assess the feasibility of their ideas. In performing a detailed assessment of potential pollution prevention practices, these groups should address the following questions:

- What are the benefits associated with the proposed measure, for example, cost savings, reduction in raw material usage, positive impact on the environment;

- What are the disadvantages, for example, high cost to the facility, potential negative impact on product quality;

- Has the facility attempted to implement the measure before, what problems did they encounter, why did they decide not to continue, have they learned anything since that time or has the technology changed so that the measure might be successful now;

- Do the benefits outweigh the disadvantages; and

- Is implementing the pollution prevention practice a high priority item or is it something that could wait until a later date?

After answering each of these questions, the group should be ready to report back to the full committee with a list of recommendations and a priority list for implementing the recommended practices.

Keys to success for this step include:

- Asking the right questions; and

- Doing the research that is necessary to answer them.

6. Developing the Pollution Prevention Plan

After each of the committee groups has finished the detailed assessment for their assigned area, the committee should reconvene. Each group should have prioritized the recommendations for their assigned area. The committee may then want to take each of these prioritized lists and develop a list of priorities for the whole facility. Those with the highest priority should be implemented first, but all of the recommended practices should be included in the pollution prevention plan.

However, a list of pollution prevention practices is just a part of the plan. The plan should also include the following information:

- A description of the goals of the program;

- Methods for documenting that the recommended practices have been implemented, including check lists that in-house inspectors can use as they walk through the facility. Figure 8-1 includes an example check list that a facility might use as the basis for inspections;

- Methods for documenting the results;

- Guidance to employees on where to go with any suggestions they may have;

- A schedule for regular meetings of the committee; and

WORK PRACTICE INSPECTION CHECKLIST

Date of Inspection _____ Name of Inspector _____

Date of Last Inspection _____

Work Practice	Yes	No
Finishing Operations		
Are the operators using proper application techniques?		
Are there any open containers of solvent?		
Are there any open containers of coating?		
Are the mix tanks closed when not in use?		
Are there any open barrels containing solvent impregnated rags?		
Gluing Operations		
Are the operators using proper application techniques?		
Are there any open containers of solvent?		
Are there any open containers of adhesives?		
Cleaning and Washoff Operations		
Are the operators using proper procedures for cleaning spray guns?		
Are the operators using proper procedures for cleaning transfer lines?		
Is the washoff tank covered when not in use?		
Are the operators tracking the number of pieces washed off and the reasons why?		
Are pieces that are being washed off allowed sufficient time to drain off excess solvent into the washoff tank before being moved?		

Figure 8-1. Example checklist for documenting work practice standards are being implemented.

- A mechanism for reviewing the plant's operations regularly so that any changes can be evaluated and potential pollution prevention practices can be incorporated.

8.2 POLLUTION PREVENTION PRACTICES FOR THE WOOD FURNITURE INDUSTRY

So what pollution prevention practices are available for a wood furniture facility? Well, one place to start is the work practice standards for the CTG and NESHAP that are presented in Chapter 3. All of these work practice standards are commonly used pollution prevention practices in the wood furniture industry. They were developed as a part of the regulatory negotiation, with input from facilities that had implemented the practices and a State office of waste reduction that has done considerable work with the wood furniture industry. Even if a facility is not subject to the CTG or the NESHAP, it should evaluate the applicability of the work practice standards to the facility. Reformulating coatings to meet the CTG and/or NESHAP emission limitations is also a pollution prevention method.

The four major sources of air pollution at wood furniture manufacturing facilities are finishing, cleaning, washoff, and gluing. Following is a discussion of pollution prevention practices for each of these emission sources. Undoubtedly, this is not a complete list. Because wood furniture manufacturing processes vary extensively within the industry, some of these practices may not be applicable to a specific facility. There may be other pollution prevention practices not listed that have already been implemented at the facility. Hopefully, these work practices will serve as a good starting point, and they can be used to form the groundwork for a site specific pollution prevention plan.

8.2.1 Finishing Operations

Many of the work practice standards discussed in Chapter 3 are pollution prevention practices that can be used to reduce both emissions and coating usage. A brief discussion of these and other pollution prevention practices for finishing operations is presented below.

8.2.1.1 Application Equipment. Both the CTG and the NESHAP limit the use of conventional air spray guns. While studies show varying results concerning the transfer efficiency of different spray guns, most indicate that conventional air spray guns are the least efficient. Because there is no clear cut advantage for other types of guns, for example, high volume low pressure (HVLP) versus air assisted airless, neither the CTG or the NESHAP

mandate what type of application equipment must be used. Facilities should test different types of application equipment to determine which type best meets their performance needs. There is no one answer that is right for every facility. In some cases, a facility may find that one type of gun is better for applying clear coats while another type is better for applying color coats.

If a facility is changing application equipment, it needs to make sure the operators are trained with the new equipment. Different types of application equipment require different application techniques. An operator may have 20 years of experience applying coatings with a conventional air spray gun, but that does not mean he or she is qualified to use an HVLP gun. Without proper operator training, the potential increase in transfer efficiency associated with the new application equipment may be more than offset by improper application techniques.

In summary, switching to more efficient application equipment can have the following benefits:

- Reduction in emissions;
- Reduction in coating usage and coating cost; and
- Possible reduction in solid waste because filters may not have to be changed as often.

However, in switching to more efficient application equipment some of the following problems could be encountered:

- Extensive testing of new application equipment may be required to determine the best equipment for the facility's applications;
- Operators will probably need to be retrained with new equipment; and
- A facility with a particularly fast finishing line may not be able to use some of the higher efficiency types of spray guns because some of the guns have a slower delivery rate.

8.2.1.2 Operator Training. Both the CTG and NESHAP require operators to be trained on an annual basis. However, this practice should be implemented at each facility whether it is subject to these standards or not. While type of application equipment is a factor in transfer efficiency, operator training may be even a bigger factor. As discussed earlier, this is particularly true when a facility introduces new application equipment requiring

different application techniques. It is also true when facilities have reformulated their coatings. Application techniques for waterborne coatings are different than those for solventborne coatings.

Providing extensive training for spray booth operators can reduce coating usage and as a result, reduce operating costs. Well trained spray booth operators can also improve the quality of the product. Using proper application techniques may also reduce the spray booth operator's exposure to solvents. Operators should be retrained each year. This should help keep them from picking up bad habits that may reduce transfer efficiency, have a negative effect on product quality, and increase their exposure to solvents.

Section 8.3 presents guidance on developing an operator training program and a discussion of the information that should be included.

Potential advantages of instituting an operator training program include:

- Reduction in emissions;
- Reduction in coating usage and cost;
- Improvements in product quality; and
- Reduction in worker exposure to solvents.

There are really few, if any, disadvantages associated with an operator training program. While there are some costs involved with the training, these may be offset by savings in other areas.

8.2.1.3 Inspection and Maintenance Plan. All equipment used to store, transfer, or apply coatings or solvents should be checked regularly for leaks or other malfunctions. Leaking equipment results not only in emissions but also in a loss of materials and additional cost to the facility. It also increases worker exposure to solvent. While some leaks may be obvious and noticed immediately, small leaks in less traveled areas may go undetected without a regularly scheduled inspection. Figure 8-2 is an example of a checklist facilities can use to document that the scheduled inspection has been conducted.

8.2.1.4 Reformulated Coatings. Obviously, reformulating coatings so that they contain less organic solvent offers the greatest opportunity for reducing emissions from finishing operations using pollution prevention practices. A discussion of the reformulated coatings available and their advantages and disadvantages is presented in Chapter 6.

EQUIPMENT INSPECTION CHECKLIST

Date of Inspection _____

Inspector's Name _____

Date of Last Inspection _____

Area 1 (e.g., mix room)

Visible leaks/malfunctioning equipment (Yes/No) _____

Source of leak _____
Description of equipment and malfunction _____
_____

Description of repairs _____
_____

Date of Repairs _____

Area 2 (e.g., transfer lines from mix room to spray booths)

Visible leaks/malfunctioning equipment (Yes/No) _____

Source of leak _____
Description of equipment and malfunction _____
_____

Description of repairs _____
_____

Date of Repairs _____

Area 3 (e.g., spray booth 1)

Visible leaks/malfunctioning equipment (Yes/No) _____

Source of leak _____
Description of equipment and malfunction _____
_____

Description of repairs _____
_____

Date of Repairs _____

Figure 8-2. Example checklist for equipment inspection program.

Facilities should carefully evaluate the alternatives available and select the ones that best fit their needs.

8.2.1.5 Other Pollution Prevention Practices for Finishing. Following is a list of other pollution prevention practices related to finishing that facilities may want to implement. Some of these are requirements of the CTG and NESHAP and some are not.

(1) Keep all tanks used for storing coatings, particularly mix tanks, covered at all times. This reduces coating and solvent usage and reduces worker exposure to solvents.

(2) Keep barrels containing used rags covered at all times. Many facilities use rags to wipe off excess stain or to polish pieces after finishing. These rags can then be a source of emissions. To minimize emissions from these rags, keep barrels handy for storing them and keep those barrels closed. Again, this will not only reduce emissions, but it will also reduce worker exposure to solvents.

(3) In many facilities, coatings are thinned with solvent before application to adjust the viscosity. There may be some instances where the facility could heat the coating to reduce its viscosity rather than thinning it with solvents.

(4) Maintain spray guns in good operating condition. Make sure that any regular maintenance procedures recommended by the vendor are followed.

8.2.2 Gluing Operations

Most of the pollution prevention practices that are applicable to finishing operations are also applicable to gluing operations. These include the following:

- Discontinuing the use of conventional air spray guns to apply adhesives;
- Training operators in proper application techniques;
- Checking for equipment leaks and malfunction;
- Reformulating adhesives; and
- Keeping containers used for storing adhesives closed.

Note that the limitation on conventional air spray guns included in the CTG and NESHAP does not include guns used to apply adhesives. However, facilities should investigate the use of alternatives to conventional air spray for the application of adhesives. This will improve transfer efficiency, thereby reducing emissions and adhesive usage.

8.2.3 Cleaning Operations

There are a number of pollution prevention practices for cleaning operations that facilities can implement to reduce emissions, reduce cleaning solvent usage, and reduce worker exposure to solvents. Many of these pollution prevention practices are included as work practice standards in the CTG and NESHAP.

8.2.3.1 Cleaning Solvent Accounting System. Many facilities do not really have a good idea of how much cleaning solvent they use and what it is used for. The first step in reducing cleaning solvent usage is to collect this information. Facilities should implement a system for determining the amount of cleaning solvent they use each month and where it is used, for example, cleaning spray guns, cleaning spray booths, cleaning transfer lines, etc. Facilities can then target those areas of highest use for reductions.

In some cases, cleaning solvent is reused as thinner for coatings. It may also be collected and sent offsite for disposal. By tracking the fate of used cleaning solvent, the facility will be able to determine the net amount of cleaning solvent that is lost, that is, emitted each month.

One way to control the amount of cleaning solvent used is to have a checkout system. Operators are given only enough solvent at the beginning of their shift to perform the cleaning needed. This allows the facility to keep track of the amount of cleaning solvent used and is a mechanism to ensure some operators are not wasting cleaning solvent.

8.2.3.2 Gun/line Cleaning. Pollution prevention practices related to spray gun and line cleaning that may be implemented include:

- Collect solvent used to clean the spray guns and lines into a container, which is subsequently closed, rather than spraying the solvent into the booth;

- Use dirty solvent for the initial cleaning, followed by clean solvent for the final cleaning. The clean solvent can then be reused for cleaning or for thinning coatings;

- Dispose of dirty solvent by contracting with a firm that distills the solvents for reuse or distill the solvents onsite for reuse;

- As much as is practical, facilities should schedule finishing operations for the day so that lighter color coats are applied early in the day and darker color coats are applied later. This should minimize the need for spray gun and line cleaning; and

- When possible, air pressure should be used instead of solvent for cleaning lines.

8.2.3.3 Spray Booth Cleaning. Almost all facilities are now using strippable spray booth coatings to reduce the need for solvent cleaning of spray booths. If your facility is not already using these coatings, this is a relatively easy way to reduce cleaning solvent usage. At a minimum, you should use cardboard or some other material to protect the spray booth walls from overspray, thereby minimizing the need to use solvent for cleaning.

8.2.3.4 Use of Alternative Cleaning Materials. The EPA is evaluating alternatives to the cleaning solvents, primarily lacquer thinner, currently being used by the industry. In some cases, lower vapor pressure solvents can be used in place of the solvents currently being used. Because of their lower vapor pressure, less of this solvent should be emitted during the cleaning process. While this option should be explored, facilities should conduct a careful investigation before changing cleaning materials. If the new cleaning solvent is not as effective at removing dried coating, the facility may end up using more solvent, thereby offsetting the benefits of the lower vapor pressure solvent.

8.2.3.5 Operator Training. Operators should also be trained in proper cleaning procedures. They should be shown the proper methods for cleaning spray guns and transfer lines. They should also be educated concerning the negative impacts of improper use of cleaning solvents. Many operators become immune to the fact that they are handling potentially dangerous solvents. They do not realize that the solvents are not only a source of emissions but are also potentially hazardous.

8.2.4 Washoff Operations

Washoff is the process of removing dried coating from the furniture. In many cases, the same solvents used for cleaning are also used for washoff. Following is a brief description of pollution prevention practices that may be implemented to reduce washoff solvent usage and emissions from the washoff process.

8.2.4.1 Washoff Solvent Accounting System. As with cleaning solvent usage, many facilities do not have a good idea of how much solvent they use for washoff. Therefore, the first step is to implement a system to account for the amount of solvent used for washoff, the number of pieces that are washed off, and the reasons for the washoff. This accounting system should help the facility identify areas where they can reduce washoff solvent usage.

For example, if one particular piece of furniture must be washed off more than others due to problems with the finish, the facility may be able to identify and correct problems operators have in finishing the piece. It may be that the piece has particularly difficult areas to finish that may be corrected by positioning the piece differently in the spray booth. The facility may also determine that one operator is having a relatively high number of pieces that need to be washed off. This may be an indicator that this operator needs additional training.

The facility may also be able to determine that washoff is being used in some cases where other methods might be successful. For example, some pieces may be able to be sanded and then refinished rather than being washed off.

8.2.4.2 Washoff Tank. The tank used for washoff should be kept covered when it is not in use. Some washoff tanks are quite large and the solvents are volatile. Therefore, the tank can be a significant source of emissions. Keeping the tank covered will minimize washoff solvent usage and emissions.

8.2.4.3 Operator Training. Again, proper training of operators can reduce washoff solvent usage. Operators should be taught to keep the washoff tank covered when not in use. They should also be taught to make sure the part is dried before moving it from over the top of the tank. This will allow the solvent to drain back into the tank rather than dripping onto the floor. Operators may also be able to tilt or rotate the part to ensure all the solvent is drained.

8.3 DEVELOPING AN OPERATOR TRAINING PROGRAM

Developing a comprehensive operator training program is a key component in a successful pollution prevention program. While an operator training program is a requirement of the CTG and NESHAP, it is also something that makes good sense from an environmental and cost perspective.

The following is a discussion of information that should be included in an operator training program and resources that are available to a facility in developing a program.

8.3.1 What Should be Included in the Program?

While the information to be included in the operator training program will vary from one facility to another due to differences in operations, there are a few basics that should probably be included in all operator training programs.

8.3.1.1 Overview of the CTG and NESHAP Requirements. While facilities do not need to go into great detail concerning the CTG and NESHAP, operators should be given some background information, particularly concerning requirements for which they are ultimately responsible and the potential consequences to the facility of failing to meet those requirements. Operators should be given copies of the checklists that plant inspectors will be using to make sure the work practice standards are being followed. They will then know what these in-house inspectors will be looking for so that if they see something they know is a violation, for example, an open container of solvent, they can correct it. They will then have an idea of what State inspectors will be looking for when they visit the facility.

The overview should also include a discussion of recordkeeping requirements. In facilities where the coatings are thinned at the spray booth, the operators will be the ones responsible for filling out the data sheets that will be used to determine the as-applied VOC/VHAP content of the coatings. The training program is an opportunity to show them how to complete the data sheets. The operators should be shown how the information from the data sheets is used, so that they understand the importance of making sure they are complete and accurate.

In summary, this section of the training program should include the following:

- Background information concerning the CTG and NESHAP;
- Discussion of the work practice standards and the importance of the operator's role in ensuring these standards are met;
- Review of any checklists the facility is planning on using to document that the work practice standards are being implemented; and
- Overview of the recordkeeping requirements, including a presentation on how to complete the data sheets when coatings are thinned and the importance of ensuring the data sheets are accurate.

8.3.1.2 Training in Proper Application Techniques. Because "proper" application technique depends upon both the type of coating and the type of application equipment, the purpose of this section is not to provide a list of do's and dont's. The purpose is to provide guidance on methods facilities might want to use to train operators in proper application techniques.

As much as possible, the program should be a hands-on training program. While videos serve as an excellent starting point, they should be followed by hands-on training with the application equipment.

So who should give this training? One possibility is to have the application equipment vendor provide the training. If a facility has just switched to a different type of application equipment, it may well be that no one at the facility has the expertise required to provide the training. In this case, the application equipment vendor is probably the best choice. If the facility is using the same application equipment, but has just switched from solventborne coatings to waterborne coatings, it may want to have the coating supplier come in and assist with the training. As discussed earlier, waterborne coatings should be applied differently than solventborne coatings. Some facilities, particularly smaller facilities that may not be able to obtain this service from their coating supplier and/or equipment vendor, may want to send one person out for extensive training so that they can then come back and train the other operators. In this case, the facility would always have someone available to train new operators as they are hired. Smaller companies may also want to pool their resources and have joint training sessions. Smaller facilities may also consider contacting a larger company in their area to find out if they have regular training sessions for their operators. If they do, the smaller facility may be able to arrange to have one of its employees sit in on one of the sessions. This employee could then train other operators in his plant.

In summary, the following are options for providing hands-on training in proper application techniques:

- Application equipment vendors;
- Coating suppliers, particularly if the facility has reformulated to a new type of coating;
- Sending an employee offsite to be trained in using different types of application equipment and different types of coatings so that person can then provide all training to the operators onsite; and
- Working with other companies to set up joint training sessions.

Make sure the hands-on training includes:

- All types of application equipment the operator will be using;

- The application of all types of coatings the operator will be using;
- The finishing of a variety of pieces, including pieces of different sizes and shapes. It is easy to use proper application technique when finishing a flat surface, but it is not so easy when finishing a chair with lots of crevices and thin slats; and
- For facilities spray applying contact adhesives, proper application techniques for adhesives, which may be very different than for coatings.

Although refresher training is required once per year by the CTG and NESHAP, facilities may want to have someone continue to evaluate operators throughout the year. It is easy for anyone to slip back into bad habits. Facilities may also want to videotape operators that are using good application techniques. The videotapes can then be used in future training sessions.

8.3.1.3 Cleaning and Washoff Procedures. The first step in training operators in using appropriate cleaning and washoff procedures is to familiarize them with the work practice standards and other elements of the pollution prevention plan that address cleaning and washoff operations. The goal of the work practice standards and the pollution prevention plan is to minimize cleaning and washoff solvent usage. The goals of this portion of the training program are to help operators realize the importance of minimizing cleaning and washoff solvent usage and the importance of the role they play.

As part of the training program, facilities should demonstrate:

- How to clean spray guns and transfer lines;
- How to clean continuous coaters; and
- How to minimize solvent losses in the washoff process.

As discussed earlier, facilities should make sure the operators are familiar with any checklists that have been developed, so they will know what to look for and can make corrections as needed.

8.3.1.4 Other Information to be Included in the Training Program. Facilities may also find it useful to include the following information in the operator training program.

(1) Facilities using an averaging approach to meet the CTG and/or NESHAP emission limits for coatings have to keep track of their coating usage. In many cases, this requires the operator to measure the amount of coating in a drum or tank at the beginning of their shift

and the amount remaining at the end of the shift. Typically, this is done by measuring the height of the coating in the drum or tank with a yardstick. While this seems fairly straightforward, it is easy to make mistakes. In the training program, facilities should demonstrate the correct way of measuring the amount of coating in the drum or tank in order to minimize errors that could potentially lead to a violation of the standard.

(2) Facilities should ensure that operators know who to go to if they do have a problem or they see a problem in another area. For example, an operator should know who to go to if they notice their spray gun is leaking or if they are walking through the plant and notice a leaking valve in one of the transfer lines. They are more likely to alert someone that there is a problem if they know who they should report the problem to. They should also know who to contact in the event of an emergency, such as a large spill.

(3) Facilities should use the training program as a forum for operators to express ideas they may have to reduce coating or solvent usage or to make their area a safer place to work. Facilities may also want to ask the operators what information they believe should be included in future training programs. They are probably the best judge of what is most useful to them.

APPENDIX A

ACRONYMS AND DEFINITIONS

A.1 LIST OF ACRONYMS

Following is a list of acronyms that are used throughout the manual. Many of these terms are included in the definitions in A.2, but the list presented here is intended to serve as a handy reference if you come across an acronym you are not familiar with. Some of these acronyms are not used in this manual, but you may come across them when studying other material related to the control of VOC and/or VHAP emissions.

Acronym	Meaning
BACT	Best available control technology
CFR	Code of Federal Regulations
CPDS	Certified product data sheet
CTG	Control Techniques Guideline
EPA	Environmental Protection Agency
FAP	Formulation assessment plan
HAP	Hazardous air pollutant
HVLP	High volume low pressure
LAER	Lowest achievable emission rate
MACT	Maximum Achievable Control Technology
MSDS	Material safety data sheet
NESHAP	National Emission Standards for Hazardous Air Pollutants
NSPS	New Source Performance Standards
NSR	New Source Review
RACT	Reasonably Available Control Technology
SIP	State implementation plan
VHAP	Volatile hazardous air pollutant
VOC	Volatile organic compound

A.2 DEFINITIONS

These definitions are from the CTG model rule and the NESHAP. However, it is not an exhaustive list. The list is limited to terms that are used in this guidance manual. Note that these definitions are based on EPA's definitions, which may not always be consistent with the industry's definitions. Because the standards are based on EPA's definitions, however, those are the definitions included here.

Adhesive means any chemical substance that is applied for the purpose of bonding two surfaces together other than by mechanical means. For the purposes of the wood furniture NESHAP, adhesives are not considered coatings or finishing materials. Products used on humans and animals, adhesive tape, contact paper, or any other product with an adhesive incorporated onto or in an inert substance are not considered adhesives under the wood furniture NESHAP.

Aerosol adhesive means a contact adhesive that is dispensed from a pressurized container as a suspension of fine solid or liquid particles in gas.

As applied means the VOC, VHAP, and solids content of the coating or contact adhesive that is actually used for coating or gluing the substrate. It includes the contribution of materials used for in-house dilution of the coating or contact adhesive.

Basecoat means a coat of colored material, usually opaque, that is applied before graining inks, glazing coats, or other opaque finishing materials, and is usually topcoated for protection.

Capture device means a hood, enclosed room, floor sweep, or other means of collecting solvent emissions or other pollutants into a duct so that the pollutant can be directed to a pollution control device such as an oxidizer or carbon adsorber.

Capture efficiency means the fraction of all organic vapors generated by a process that are directed to a control device.

Certified product data sheet (CPDS) means documentation furnished by coating or adhesive suppliers or an outside laboratory that provides the VHAP content, VOC content, solids content, and density of a finishing material, contact adhesive, or solvent. The VHAP content should be measured by EPA Method 311, an equivalent or alternative method, or formulation data if all HAP present in the coating or contact adhesive is solvent. The reportable VHAP content should represent the maximum aggregate emissions potential of the finishing material, contact adhesive or solvent in concentrations greater than or equal to 1.0 percent by weight or 0.1 percent for VHAP that are carcinogens, as defined by the Occupational Safety and Health Administration Hazard Communication Standard (29 CFR 1910), as formulated. The VOC content, solids content, and density of the coating or contact adhesive should be measured by EPA Method 24, an alternative or equivalent method, or formulation data if all of the VOC present in the coating or contact adhesive is

solvent. The purpose of the CPDS is to assist the facility in demonstrating compliance with the CTG and/or NESHAP emission limits.

(Note: Because the optimum analytical conditions under EPA Method 311 vary by coating, the coating or adhesive supplier may also choose to include on the CPDS the optimum analytical conditions for analysis of the coating, adhesive, or solvent using EPA Method 311. Such information may include, but not be limited to, separation column, oven temperature, carrier gas, injection port temperature, extraction solvent, and internal standard.)

Cleaning operations means operations in which organic solvent is used to remove coating materials or adhesives from equipment used in wood furniture manufacturing operations.

Coating means a protective, decorative, or functional film applied in a thin layer to a surface. Such materials include, but are not limited to, paints, topcoats, varnishes, sealers, stains, washcoats, basecoats, enamels, inks, and temporary protective coatings.

Coating solids (or solids) means the part of the coating which remains after the coating is dried or cured; solids content is determined using data from EPA Method 24.

Compliant coating/contact adhesive means a finishing material, contact adhesive, or strippable booth coating that meets the CTG and/or NESHAP emission limits specified in Tables 2-2 and 2-4 of this manual.

Contact adhesive means an adhesive that is applied to two substrates, dried, and mated under only enough pressure to result in good contact. The bond is immediate and is sufficiently strong to hold pieces together without further clamping, pressure, or airing.

Continuous coater means a finishing system that continuously applies finishing materials onto furniture parts moving along a conveyor. Finishing materials that are not transferred to the part are recycled to a reservoir. Several types of application methods can be used with a continuous coater including spraying, curtain coating, roll coating, dip coating, and flow coating.

Control device (also referred to as an add-on control device in this manual) means any equipment that reduces the quantity of a pollutant that is emitted to the air. The device may destroy or secure the pollutant for subsequent recovery. Includes, but is not limited to, oxidizers, carbon adsorbers, and condensers.

Control device efficiency means the ratio of the pollution released by a control device to the pollution introduced to the control device.

Control system means the combination of capture and control devices used to reduce emissions to the atmosphere.

Conventional air spray means a spray coating method in which the coating is atomized by mixing it with compressed air and applied at an air pressure greater than 10 pounds per square inch (gauge) at the point of atomization. Airless and air assisted airless spray technologies are not conventional air spray because the coating is not atomized by mixing it with compressed air. Electrostatic spray technology is also not considered conventional air spray because an electrostatic charge is employed to attract the coating to the workpiece.

Emission means the release or discharge, whether directly or indirectly, of HAP and/or VOC into the ambient air.

Enamel means a coat of colored material, usually opaque, that is applied as a protective topcoat over a basecoat, primer, or previously applied enamel coats. In some cases, another finishing material may be applied as a topcoat over the enamel.

Equipment leak means emissions of VHAP and/or VOC from pumps, valves, flanges, or other equipment used to transfer or apply coatings, adhesives, or organic solvents.

Finishing material means a coating used in the wood furniture industry. Such materials include, but are not limited to, stains, basecoats, washcoats, enamels, sealers, and topcoats.

Finishing operation means those operations in which finishing material is applied to a substrate and is subsequently air-dried, cured in an oven, or cured by radiation.

Foam adhesive means a contact adhesive used for gluing foam to fabric, foam to foam, and fabric to wood.

Gluing operation means those operations in which contact adhesives are used to join components, for example, to apply a laminate to a wood substrate or foam to fabric.

Incidental wood furniture manufacturer means a major source that is primarily engaged in the manufacture of products other than wood furniture or wood furniture components and uses no more than 100 gallons per month of finishing material or adhesives in the manufacture of wood furniture or wood furniture components.

Material Safety Data Sheet (MSDS) means the documentation required for hazardous chemicals by the Occupational Safety and Health Administration (OSHA) Hazard Communication Standard (29 CFR 1910) for a solvent, cleaning material, contact adhesive, coating, or other material that identifies select reportable hazardous ingredients of the material, safety and health considerations, and handling procedures.

Nonporous substrate means a surface that is impermeable to liquids. Examples include metal, rigid plastic, flexible vinyl, and rubber.

Organic solvent means a volatile organic liquid that is used for dissolving or dispersing constituents in a coating, adjusting the viscosity of a coating or adhesive, or

cleaning equipment. When used in a coating or adhesive, the organic solvent evaporates during drying and does not become a part of the dried film.

Overall control efficiency means the efficiency of a control system, calculated as the product of the capture and control device efficiencies, expressed as a percentage.

Potential to emit means the maximum capacity of a stationary source to emit a pollutant under its physical and operational design.

Research or laboratory facility means any stationary source whose primary purpose is to conduct research and development to develop new processes and products where such source is operated under the chose supervision of technically trained personnel and is not engaged in the manufacture of products for commercial sale in commerce, except in a de minimis manner.

Sealer means a finishing material used to seal the pores of a wood substrate before additional coats of finishing material are applied. Special purpose finishing materials that are used in some finishing systems to optimize aesthetics are not sealers.

Solvent means a liquid used in a coating or contact adhesive to dissolve or disperse constituents and/or to adjust viscosity. It evaporates during drying and does not become a part of the dried film.

Stain means any color coat having a solids content by weight of no more than 8.0 percent that is applied in single or multiple coats directly to the substrate. Includes, but is not limited to, nongrain raising stains, equalizer stains, prestains, sap stains, body stains, no-wipe stains, penetrating stains, and toners.

Strippable spray booth coating means a coating that (1) is applied to a spray booth wall to provide a protective film to receive overspray during the finishing operations; (2) that is subsequently peeled off and disposed; and (3) by achieving (1) and (2) reduces or eliminates the need to use organic solvents to clean spray booth walls.

Substrate means the surface onto which a coating or contact adhesive is applied (or into which a coating or contact adhesive is impregnated).

Thinner means a volatile liquid that is used to dilute coatings or contact adhesives (to reduce viscosity, color strength, and solids, or to modify drying conditions).

Topcoat means the last film-building finishing material that is applied in a finishing system.

Touch-up and repair means the application of finishing materials to cover minor finishing imperfections.

VHAP means any hazardous air pollutant listed in Table E-1.

VHAP of potential concern means any VHAP from the list presented in Table A-1.

Volatile organic compound (VOC) means any organic compound that participates in atmospheric photochemical reactions, that is, any organic compound other than those that the Administrator designates as having negligible photochemical reactivity. A VOC may be measured by a reference method, an equivalent method, an alternative method, or by procedures specified in any rule. However, these methods may also measure nonreactive organic compounds. In such cases, the owner or operator may exclude the nonreactive organic compounds when determining compliance with a standard. For a list of compounds that the Administrator has designated as having negligible photochemical reactivity, refer to 40 CFR 51.00.

Washcoat means a transparent special purpose finishing material having a solids content by weight of 12.0 percent or less. Washcoats are applied over initial stains to protect, to control color, and to stiffen the wood fibers in order to aid sanding.

Washoff operations means those operations in which organic solvent is used to remove coating from wood furniture or a wood furniture component.

Wood furniture means any product made of wood, a wood product such as rattan or wicker, or an engineered wood product such as particleboard that is manufactured under any of the following standard industrial classification codes: 2434, 2511, 2512, 2517, 2519, 2521, 2531, 2541, 2599, or 5712.

Wood furniture component means any part that is used in the manufacture of wood furniture. Examples include drawer sides, cabinet doors, seat cushions, and laminated tops.

Wood furniture manufacturing operations means the finishing, gluing, cleaning, and washoff operations associated with the production of wood furniture or wood furniture components.

TABLE A-1. VHAP OF POTENTIAL CONCERN

CAS No.	Chemical name
"NONTHRESHOLD" POLLUTANTS	
92671	4-Aminobiphenyl
96093	Styrene oxide
64675	Diethyl sulfate
59892	N-Nitrosomorpholine
68122	Dimethyl formamide
80319	Hexamethylphosphoramide
60355	Acetamide
101779	4,4'-Methylenedianiline
90040	o-Anisidine
1746016	2,3,7,8-Tetrachlorodibenzo-p-dioxin
92875	Benzidine
684935	N-Nitroso-N-methylurea
542881	Bis(chloromethyl)ether
79447	Dimethyl carbamoyl chloride
75558	1,2-Propylenimine (2-Methyl aziridine)
57147	1,1-Dimethyl hydrazine
96128	1,2-Dibromo-3-chloropropane
62759	N-Nitrosodimethylamine
50328	Benzo (a) pyrene
1336363	Polychlorinated biphenyls (Aroclors)
76448	Heptachlor
119937	3,3'-Dimethyl benzidine
79061	Acrylamide
118741	Hexachlorobenzene
57749	Chlordane
1120714	1,3-Propane sultone
106990	1,3-Butadiene
53963	2-Acetylaminoflourine
53963	3,3'-Dichlorobenzidine
58899	Lindane (hexachlorcyclohexane, gamma)
95807	2,4-Toluene diamine
111444	Dichloroethyl ether (Bis(2-chloroethyl)ether)
122667	1,2 - Diphenylhydrazine
8001352	Toxaphene (chlorinated camphene)
121142	2,4-Dinitrotoluene
119904	3,3'-Dimethoxybenzidine
50000	Formaldehyde
101144	4,4'-Methylene bis(2-chloroaniline)
107131	Acrylonitrile
106934	Ethylene dibromide(1,2-Dibromoethane)
72559	DDE (1,1-p-chlorophenyl 1-2 dichloroethylene)
510156	Chlorobenzilate

TABLE A-1. (continued)

CAS No.	Chemical name
62737	Dichlorvos
75014	Vinyl chloride
75218	Ethylene oxide
96457	Ethylene thiourea
593602	Vinyl bromide (bromoethene)
67663	Chloroform
87865	Pentachlorophenol
51796	Ethyl carbamate (Urethane)
107062	Ethylene dichloride (1,2-Dichloroethane)
78875	Propylene dichloride (1,2-Dichloropropane)
56235	Carbon tetrachloride
71432	Benzene
140885	Ethyl acrylate
75569	Propylene oxide
62533	Aniline
106467	1,4-Dichlorobenzene(p)
88062	2,4,6-Trichlorophenol
117817	Bis(2-ethylhexyl)phthalate (DEHP)
95534	o-Toluidine
114261	Propoxur
79016	Trichloroethylene
123911	1,4-Dioxane (1,4-Diethyleneoxide)
75070	Acetaldehyde
75252	Bromoform
133062	Captan
106898	Epichlorohydrin
75092	Methylene chloride (Dichloromethane)
127184	Tetrachloroethylene (Perchloroethylene)
53703	Dibenz (ah) anthracene
218019	Chrysene
60117	Dimethyl aminoazobenzene
56553	Benzo (a) anthracene
205992	Benzo (b) fluoranthene
79469	2-Nitropropane
542756	1,3-Dichloropropene
57976	7, 12-Dimethylbenz(a)anthracene
225514	Benz(c)acridine
193395	Indeno(1,2,3-cd)pyrene
189559	1,2:7,8-Dibenzopyrene
79345	1,1,2,2-Tetrachloroethane
91225	Quinoline
75354	Vinylidene chloride (1,1-Dichloroethylene)

TABLE A-1. (continued)

CAS No.	Chemical name
87683	Hexachlorobutadiene
82688	Pentachloronitrobenzene (Quintobenzene)
78591	Isophorone
79005	1,1,2-Trichloroethane
74873	Methyl chloride (Chloromethane)
67721	Hexachloroethane
1582098	Trifluralin
1319773	Cresols/Cresylic acid (isomers and mixture)
108394	m-Cresol
75343	Ethylidene dichloride (1,1-Dichloroethane)
95487	o-Cresol
106445	p-Cresol
74884	Methyl iodide (Iodomethane)
100425	Styrene[a]
107051	Allyl chloride
334883	Diazomethane
95954	2,4,5 - Trichlorophenol
133904	Chloramben
106887	1,2 - Epoxybutane
108054	Vinyl acetate
126998	Chloroprene
123319	Hydroquinone
92933	4-Nitrobiphenyl
"HIGH-CONCERN" POLLUTANTS	
56382	Parathion
13463393	Nickel Carbonyl
60344	Methyl hydrazine
75218	Ethylene oxide
151564	Ethylene imine
77781	Dimethyl sulfate
107302	Chloromethyl methyl ether
57578	beta-Propiolactone
100447	Benzyl chloride
98077	Benzotrichloride
107028	Acrolein
584849	2,4 - Toluene diisocyanate
75741	Tetramethyl lead
78002	Tetraethyl lead
12108133	Methylcyclopentadienyl manganese
624839	Methyl isocyanate
77474	Hexachlorocyclopentadiene
62207765	Fluomine

TABLE A-1. (continued)

CAS No.	Chemical name
10210681	Cobalt carbonyl
79118	Chloroacetic acid
534521	4,6-Dinitro-o-cresol, and salts
101688	Methylene diphenyl diisocyanate
108952	Phenol
62384	Mercury, (acetato-o) phenyl
98862	Acetophenone
108316	Maleic anhydride
532274	2-Chloroacetophenone
51285	2,4-Dinitrophenol
108864	2-Methyoxy ethanol
98953	Nitrobenzene
74839	Methyl bromide (Bromomethane)
75150	Carbon disulfide
121697	N,N-Dimethylaniline
"UNRANKABLE" POLLUTANTS	
106514	Quinone
123386	Propionaldehyde
120809	Catechol
85449	Phthalic anhydride
463581	Carbonyl sulfide
132649	Dibenzofurans
100027	4-Nitrophenol
540841	2,2,4-Trimethylpentane
11422	Diethanolamine
822060	Hexamethylene-1,6-diisocyanate
-	Glycol ethers[b]
-	Polycyclic organic matter[c]

* = Currently an EPA weight of evidence classification is under review

[a]The EPA does not currently have an official weight-of-evidence classification for styrene. For purposes of this rule, styrene is treated as a "nonthreshold" pollutant. (See data report form in appendix A of the hazard ranking technical background document.)

[b]Except for 2-ethoxy ethanol, ethylene glycol monobutyl ether, and 2-methoxy ethanol.

[c]Except for benzo(b)fluoranthene, benzo(a)anthracene, benzo(a)pyrene, 7,12-dimethylbenz(a)anthracene, benz(c)acridine, chrysene, dibenz(ah) anthracene, 1,2:7,8-dibenzopyrene, indeno(1,2,3-cd)pyrene, but including dioxins and furans.

APPENDIX B.

LIST OF CONTACTS

This appendix includes a listing of State, EPA, and industry contacts.

B.1 STATE CONTACTS

Table B-1 is a list of State agencies. In some cases, you may need to work with a local agency, but the State agency will be able to refer you to the local agency if necessary. If you are a small business, they can also refer you to the State's Small Business Ombudsman and/or the State Small Business Assistance Program.

TABLE B-1. LISTING OF STATE AGENCIES

State	Name of Agency	Phone No.
Alabama	Alabama Department of Environmental Management, Air Division	(205) 271-7861
Alaska	Department of Environmental Conservation	(907) 465-5100
Arizona	Office of Air Quality	(602) 207-2308
Arkansas	Department of Pollution Control and Ecology	(501) 562-7444
California	Air Resources Board	(916) 322-2990
Colorado	Department of Health, Air Pollution Control Division	(303) 692-3100
Connecticut	Air Management Bureau	(203) 566-2690
Delaware	Department of Natural Resources and Environmental Control, Division of Air and Waste Management	(302) 739-4764
Florida	Department of Environmental Protection	(904) 488-0114
Georgia	Air Protection Branch	(404) 363-7000
Hawaii	Clean Air Branch	(808) 586-4200
Idaho	Department of Health and Welfare, Division of Environmental Quality	(208) 334-0502
Illinois	Environmental Protection Agency, Division of Air Pollution Control	(217) 782-7326
Indiana	Department of Environmental Management	(317) 232-8222
Iowa	Department of Natural Resources	(515) 281-5145
Kansas	Bureau of Air and Radiation	(913) 296-1593
Kentucky	Division for Air Quality	(502) 564-3382
Louisiana	Department of Environmental Quality, Office of Air Quality and Radiation Protection	(504) 765-0219
Maine	Bureau of Air Quality Control, Department of Environmental Protection	(207) 289-2437
Maryland	Air & Radiation Management Administration	(410) 631-3255
Massachusetts	Division of Air Quality Control	(617) 292-5593
Michigan	Air Quality Division, Department of Natural Resources	(517) 373-7023
Minnesota	Air Pollution Control, Pollution Control Agency	(612) 296-7331
Mississippi	Department of Environmental Quality	(601) 961-5171
Missouri	Department of Natural Resources/Air Pollution Control Program	(314) 751-4817
Montana	State Department of Health and Environmental Sciences	(406) 444-3454
Nebraska	Air Quality Program, Department of Environmental Quality	(402) 471-2189

TABLE B-1. (continued)

State	Name of Agency	Phone No.
Nevada	Bureau of Air Quality/Division of Environmental Protection	(702) 687-4670
New Hampshire	Department of Environmental Services, Air Resources Division	(603) 271-1370
New Jersey	Department of Environmental Protection and Energy, Air Pollution Control Program	(609) 292-6704
New Mexico	Environmental Department/Air Quality Bureau	(505) 827-2850
New York	Department of Environmental Conservation, Division of Air Resources	(518) 457-7230
North Carolina	Division of Environmental Management	(919) 733-3340
North Dakota	State Department of Health	(701) 221-5188
Ohio	Ohio Environmental Protection Agency	(614) 644-2270
Oklahoma	Department Environmental Quality/Air Quality Division	(405) 271-5220
Oregon	Air Quality Division, Department of Environmental Quality	(503) 229-5359
Pennsylvania	Department of Environmental Resources, Bureau of Air Quality	(717) 787-9702
Rhode Island	Division of Air Resources	(401) 277-2808
South Carolina	Department of Health and Environmental Control, Bureau of Air Quality	(803) 734-4750
South Dakota	Department of Environment and Natural Resources, Division of Environmental Regulation	(605) 773-3351
Tennessee	Tennessee Division of Air Pollution Control	(615) 532-0554
Texas	Texas Natural Resources Conservation Commission	(512) 451-5711
Utah	Division of Air Quality, Department of Environmental Quality	(801) 536-4000
Vermont	Air Pollution Control Division, Agency of Natural Resources	(802) 244-8731
Virginia	Department of Air Pollution Control	(804) 786-2378
Washington	State Department of Ecology	(206) 459-6256
West Virginia	Air Pollution Control Commission	(304) 348-4022
Wisconsin	Department of Natural Resources, Bureau of Air Management	(608) 266-7718
Wyoming	Air Quality Division, Department of Environmental Quality	(307) 777-7391

B.2 EPA CONTACTS

If you have questions for EPA, the best place to start is the EPA regional office for your State. They will either be able to answer your questions or refer you to someone who can. Table B-2 includes a list of the EPA regions, the States they cover, and their telephone number and location.

TABLE B-2. EPA REGIONS

Region	Phone No.	States covered	Address
1	(617) 565-2734	CT, ME, MA, NH, RI, VT	Director, Air, Pesticides and Toxics Division J.F.K. Federal Bldg. Boston, MA 02203-2211
2	(212) 264-6676	NJ, NY	Director, Air and Waste Management Div. 26 Federal Plaza New York, NY 10278
3	(215) 597-9390	DE, MD, PA, VA, WV & District of Columbia	Director, Air Management Division, 841 Chestnut Street Philadelphia, PA 19107
4	(404) 347-2864	AL, FL, GA, KY, MS, NC, SC, TN	Director, Air, Pesticides and Toxics Division 345 Courtland St., NE Atlanta, GA 30365
5	(312) 886-6793	IL, IN, MI, WI, MN & OH	Director, Air and Radiation Division 77 West Jackson Blvd. Chicago, IL 60604
6	(214) 665-7225	AR, LA, NM, OK, & TX	Director, Air, Pesticides and Toxics 1445 Ross Avenue Dallas, TX 75202-2733
7	(913) 551-7097	IA, KS, MO, NE	Director, Air and Toxics Division 726 Minnesota Avenue Kansas City, KS 66101
8	(303) 293-1886	CO, MT, ND, SD, UT, WY	Director, Air and Toxics Division 999 18th Street 1 Denver Place, Suite 500 Denver, CO 80202-2405
9	(415) 794-1143	AZ, CA, HI, NV	Director, Air and Toxics Division 75 Hawthorne Street San Francisco, CA 94105
10	(206) 553-1949	AK, ID, WA, OR	Director, Air and Toxics Division 1200 Sixth Avenue Seattle, WA 98101

TABLE B-2. (continued)

B.3 TRADE ASSOCIATIONS

Following is a list of contacts from the major trade associations representing the wood furniture industry and wood furniture coating suppliers.

American Furniture Manufacturers Association
P.O. Box HP-7
High Point, NC 27261
(910) 884-5000
Mr. Larry Runyan

Business and Institutional Furniture Manufacturers Association
2680 Horizon Drive S.E.
Grand Rapids, MI 49546
(616) 285-3963
Mr. Brad Miller

Kitchen Cabinet Manufacturers Association
1899 Preston White Drive
Reston, VA 22091-4326
(703) 264-1690
Mr. Dick Titus

National Paint and Coatings Association
1500 Rhode Island Avenue, NW
Washington, DC 20005
(202) 462-6272
Mr. Bob Nelson

APPENDIX C.

OZONE NONATTAINMENT AREAS

This appendix includes a listing of ozone nonattainment areas by State. While this is the most up-to-date listing available from EPA (current as of January 3, 1995), you should be aware that the list is always changing. For example, Shelby County in Tennessee has been redesignated as an attainment area since this listing was compiled. Contact your State or local permitting authority if you have any questions about your current attainment/nonattainment status.

APPENDIX D.

DETAILED TABLE OF CONTENTS FOR THE NESHAP

Although we hope that this manual will answer most of the your questions concerning the NESHAP, there may still be times when you will have to go directly to the regulation for the answer to specific questions. Hopefully, the table of contents presented in Table D-1 will make the search easier.

TABLE D-1. NESHAP TABLE OF CONTENTS

Requirement	Location in Regulation
Applicability	
Applicability of the regulation	63.800(a)
Sources specifically exempted from the regulation	63.800(b)
Exemption for research and laboratory facilities	63.800(c)
List of sections of EPA's General Provisions regulation (subpart N) that apply to sources covered under this regulation	63.800(d)
Compliance dates for existing sources	63.800(e)
Compliance date for new sources	63.800(f)
Guidance for determining if source is reconstructed	63.800(g)
Definitions and Nomenclature	
Definitions used in the regulation	63.801(a)
Definitions of terms used in equations in the regulation	63.801(b)
Emission Limits	
Emission limits for existing sources	63.802(a)
Emission limits for new sources	63.802(b)
Work Practice Standards	
Work practice implementation plan	63.803(a)
Operator training requirements	63.803(b)
Inspection and maintenance plan	63.803(c)
Cleaning and washoff solvent accounting system	63.803(d)
Chemical composition of cleaning and washoff solvents	63.803(e)
Spray booth cleaning restrictions	63.803(f)
Storage requirements	63.803(g)
Application equipment requirements	63.803(h)
Gun and line cleaning	63.803(i)&(j)
Washoff operations	63.803(k)
Formulation assessment plan	63.803(l)
Compliance Provisions	
Compliance options for finishing operations	63.804(a)&(d)
Compliance options for gluing operations	63.804(b),(c) & (e)
Methods to demonstrate initial compliance	63.804(f)
Methods to demonstrate continuous compliance	63.804(g)

TABLE D-1. (continued)

Requirement	Location in Regulation
Performance Test Methods	
Test methods for determining the VHAP content of coatings and adhesives (cited here, but actual methods will be in 40 CFR part 60, Appendix A)	63.805(a)
Test methods for sources using control device to comply with the regulation	63.805(b),(c), (d),&(e)
Recordkeeping Requirements	
Recordkeeping requirements for sources using compliant coatings and/or averaging to comply with the regulation	63.806(b),(c) & (d)
Recordkeeping requirements associated with work practice standards	63.806(e)
Recordkeeping requirements for sources using control system to comply with the regulation	63.806(f)&(g)
Miscellaneous recordkeeping requirements	63.806(h),(i) & (j)
Reporting Requirements	
Initial notification requirements	63.807(b)
Ongoing compliance status reports	63.807(c)
Reporting requirements for sources using a control system	63.807(d)
Reporting requirements associated with the formulation assessment plan	63.807(e)

APPENDIX E.

LIST OF VOLATILE HAZARDOUS AIR POLLUTANTS

Table E-1 includes a list of volatile hazardous air pollutants. The NESHAP emission limits are based only on the VHAP content of the coatings and adhesives, not the total HAP content. Some coatings, particularly the stains, may contain small amounts of metals that are also VHAP, but the emission limit does not include these compounds. Therefore, the list presented here is only for VHAP. For a listing of all 189 hazardous air pollutants, see Section 112 of the 1990 Clean Air Act Amendments.

TABLE E-1. LIST OF VOLATILE HAZARDOUS AIR POLLUTANTS

Chemical name	CAS No.
Acetaldehyde	75070
Acetamide	60355
Acetonitrile	75058
Acetophenone	98862
2-Acetylaminofluorine	53963
Acrolein	107028
Acrylamide	79061
Acrylic acid	79107
Acrylonitrile	107131
Allyl chloride	107051
4-Aminobiphenyl	92671
Aniline	62533
o-Anisidine	90040
Benzene	71432
Benzidine	92875
Benzotrichloride	98077
Benzyl chloride	100447
Biphenyl	92524
Bis(2-ethylhexyl)phthalate (DEHP)	117817
Bis(chloromethyl)ether	542881
Bromoform	75252
1,3-Butadiene	106990
Caprolactam	105602
Carbon disulfide	75150
Carbon tetrachloride	56235
Carbonyl sulfide	463581
Catechol	120809
Chloroacetic acid	79118
2-Chloroacetophenone	532274
Chlorobenzene	108907
Chloroform	67663
Chloromethyl methyl ether	107302
Chloroprene	126998
Cresols (isomers and mixture)	1319773
o-Cresol	95487
m-Cresol	108394
p-Cresol	106445

TABLE E-1. (continued)

Chemical name	CAS No.
Cumene	98828
2,4-D (2,4-Dichlorophenoxyacetic acid, including salts and esters)	94757
DDE (1,1-Dichloro-2,2-bis(p-chlorophenyl)ethylene)	72559
Diazomethane	334883
Dibenzofuran	132649
1,2-Dibromo-3-chloropropane	96128
Dibutylphthalate	84742
1,4-Dichlorobenzene	106467
3,3'-Dichlorobenzidine	91941
Dichloroethyl ether (Bis(2-chloroethyl)ether)	111444
1,3-Dichloropropene	542756
Diethanolamine	111422
N,N-Dimethylaniline	121697
Diethyl sulfate	64675
3,3'-Dimethoxybenzidine	119904
4-Dimethylaminoazobenzene	60117
3,3'-Dimethylbenzidine	119937
Dimethylcarbamoyl chloride	79447
N,N-Dimethylformamide	68122
1,1-Dimethylhydrazine	57147
Dimethyl phthalate	131113
Dimethyl sulfate	77781
4,6-Dinitro-o-cresol, and salts	
2,4-Dinitrophenol	51285
2,4-Dinitrotoluene	121142
1,4-Dioxane (1,4-Diethyleneoxide)	123911
1,2-Diphenylhydrazine	122667
Epichlorohydrin (1-Chloro-2,3-epoxypropane)	106898
1,2-Epoxybutane	106887
Ethyl acrylate	140885
Ethylbenzene	100414
Ethyl carbamate (Urethane)	51796
Ethyl chloride (Chloroethane)	75003
Ethylene dibromide (Dibromoethane)	106934
Ethylene dichloride (1,2-Dichloroethane)	107062
Ethylene glycol	107211
Ethylene oxide	75218
Ethylenethiourea	96457
Ethylidene dichloride (1,1-Dichloroethane)	75343
Formaldehyde	50000
Glycol ethers	0
Hexachlorobenzene	118741
Hexachloro-1,3-butadiene	87683
Hexachloroethane	67721
Hexamethylene-1,6-diisocyanate	822060

TABLE E-1. (continued)

Chemical name	CAS No.
Hexamethylphosphoramide	680319
Hexane	110543
Hydrazine	302012
Hydroquinone	123319
Isophorone	78591
Maleic anhydride	108316
Methanol	67561
Methyl bromide (Bromomethane)	74839
Methyl chloride (Chloromethane)	74873
Methyl chloroform (1,1,1-Trichloroethane)	71556
Methyl ethyl ketone (2-Butanone)	78933
Methylhydrazine	60344
Methyl iodide (Iodomethane)	74884
Methyl isobutyl ketone (Hexone)	108101
Methyl isocyanate	624839
Methyl methacrylate	80626
Methyl tert-butyl ether	1634044
4,4'-Methylenebis(2-chloroaniline)	101144
Methylene chloride (Dichloromethane)	75092
4,4'-Methylenediphenyl diisocyanate (MDI)	101688
4,4'-Methylenedianiline	101779
Naphthalene	91203
Nitrobenzene	98953
4-Nitrobiphenyl	92933
4-Nitrophenol	100027
2-Nitropropane	79469
N-Nitroso-N-methylurea	684935
N-Nitrosodimethylamine	62759
N-Nitrosomorpholine	59892
Phenol	108952
p-Phenylenediamine	106503
Phosgene	75445
Phthalic anhydride	85449
Polychlorinated biphenyls (Aroclors)	1336363
Polycyclic Organic Matter[b]	0
1,3-Propane sultone	1120714
beta-Propiolactone	57578
Propionaldehyde	123386
Propoxur (Baygon)	114261
Propylene dichloride (1,2-Dichloropropane)	78875
Propylene oxide	75569
1,2-Propylenimine (2-Methyl aziridine)	75558
Quinone	106514
Styrene	100425
Styrene oxide	96093

TABLE E-1. (continued)

Chemical name	CAS No.
2,3,7,8-Tetrachlorodibenzo-p-dioxin	1746016
1,1,2,2-Tetrachloroethane	79345
Tetrachloroethylene (Perchloroethylene)	127184
Toluene	108883
2,4-Toluenediamine	95807
Toluene-2,4-diisocyanate	584849
o-Toluidine	95534
1,2,4-Trichlorobenzene	120821
1,1,2-Trichloroethane	79005
Trichloroethylene	79016
2,4,5-Trichlorophenol	95954
2,4,6-Trichlorophenol	88062
Triethylamine	121448
Trifluralin	1582098
2,2,4-Trimethylpentane	540841
Vinyl acetate	108054
Vinyl bromide	593602
Vinyl chloride	75014
Vinylidene chloride (1,1-Dichloroethylene)	75354
Xylenes (isomers and mixture)	1330207
o-Xylene	95476
m-Xylene	108383
p-Xylene	106423

[a]Includes mono- and di-ethers of ethylene glycol, diethylene glycols and triethylene glycol; R-(OCH_2CH_2)RR-OR where: n = 1, 2, or 3; R = alkyl or aryl groups; R' = R, H, or groups which, when removed, yield glycol ethers with the structure: R-(OCH_2CH_2)$_n$ - OH. Polymers are excluded from the glycol category.

[b]Includes organic compounds with more than one benzene ring, and which have a boiling point greater than or equal to 100°C.

APPENDIX F.

FEDERAL REGISTER NOTICE--WOOD FURNITURE NESHAP

APPENDIX G

EXAMPLE REPORTING FORMS

INITIAL NOTIFICATION REPORT

Applicable Rule: 40 CFR Part 63, Subpart JJ--National Emission Standards for Wood Furniture Manufacturing Operations

1. Print or type the following information for each plant in which wood furniture manufacturing operations are performed:

   Owner/Operator/Title _____

   Street Address _____

   City _____ State _____ Zip Code _____

   Plant Name _____

   Plant Phone Number _____

   Plant Contact/Title _____

   Plant Address (if different than owner/operator's): _____

   Street Address _____

   City _____ State _____ Zip Code _____

2. Provide a brief description of the wood furniture manufacturing process used at your facility.

   _____

   _____

   _____

   _____

   _____

   _____

3. Estimate of annual use of coatings, adhesives, cleaning, and washoff materials: _____ gal

4. Indicate your anticipated compliance approach:

   ☐ Compliant coatings
   ☐ Averaging
   ☐ Control device
   ☐ Combination: _____

5. Print or type the name of the Responsible Official for the plant:

   _____

   (Name) (Title)

INITIAL NOTIFICATION REPORT (continued)

A Responsible Official can be:

- The president, vice-president, secretary, or treasurer of the company that owns the plant;
- The owner of the plant;
- The plant engineer or supervisor;
- A government official if the plant is owned by the Federal, State, city, or county government; or
- A ranking military officer if the plant is located on a military base.

I certify the information contained in this report to be accurate and true to the best of my knowledge.

(Signature of Responsible Official) (Date)

INITIAL COMPLIANCE STATUS REPORT

Applicable Rule: 40 CFR Part 63, Subpart JJ--National Emission Standards for Wood Furniture Manufacturing Operations

1. Print or type the following information for each plant in which wood furniture manufacturing operations are performed:

   Owner/Operator/Title _____

   Street Address _____

   City _____ State _____ Zip Code _____

   Plant Name _____

   Plant Phone Number _____

   Plant Contact/Title _____

   Plant Address (if different than owner/operator's): _____

   Street Address _____

   City _____ State _____ Zip Code _____

2. Indicate whether the facility is a new or existing source:
   - ☐ New source (construction commenced on or after December 6, 1994)
   - ☐ Existing source

3. Indicate the facility's compliance date: ____/____/____

4. Indicate the facility's compliance approach:
   - ☐ Compliant Coatings/Adhesives
     - ☐ The facility is using compliant coatings, thinners, and/or adhesives.
   - ☐ Compliant Coatings with continuous coaters
     - ☐ The facility is using compliant coatings, as determined by the VHAP content of the coating in the reservoir and the calculated VHAP content, and compliant thinners
     - ☐ The facility is using compliants coatings and thinners and monitoring the viscosity of the coating in the reservoir, and attach data demonstrating the relationship between viscosity and VHAP content of the coating.
   - ☐ Averaging
     - ☐ A copy of the averaging calculation for the month in which the compliance date fell is attached.

INITIAL COMPLIANCE STATUS REPORT (continued)

☐ Control Device

☐ A copy of the facility's monitoring plan and results from the initial performance test are attached.

☐ Combination of methods

Indicate combination of compliance methods being used:

_____

☐ Requirements for both methods are attached.

5. Work Practice Standards

☐ The facility has developed a work practice implementation plan and has established procedures for implementing the provisions of the plan.

6. Print or type the name of the Responsible Official for the plant:

_____

(Name) (Title)

A Responsible Official can be:

- The president, vice-president, secretary, or treasurer of the company that owns the plant;
- The owner of the plant;
- The plant engineer or supervisor;
- A government official if the plant is owned by the Federal, State, city, or county government; or
- A ranking military officer if the plant is located on a military base.

I certify the information contained in this report to be accurate and true to the best of my knowledge.

_____

(Signature of Responsible Official) (Date)

CONTINUOUS COMPLIANCE STATUS REPORT

Applicable Rule: 40 CFR Part 63, Subpart JJ--National Emission Standards for Wood Furniture Manufacturing Operations

1. Print or type the following information for each plant in which wood furniture manufacturing operations are performed.

   Owner/Operator/Title _____

   Street Address _____

   City _____ State _____ Zip Code _____

   Plant Name _____

   Plant Phone Number _____

   Plant Contact/Title _____

   Plant Address (if different than owner/operator's): _____

   Street Address _____

   City _____ State _____ Zip Code _____

2. Indicate the beginning and ending dates of the reporting period:

   Beginning: ____/____/____ Ending: ____/____/____

3. Check all that apply for the facility's compliance approach.

   For facilities using a compliant coatings/adhesives approach:

   ☐ Each day in this reporting period, compliant thinners, coatings, and/or adhesives were used.

   Indicate below on what dates any noncompliant coatings (including strippable spray booth coatings), thinners, or adhesives were used during the reporting period and why:

   _____

   _____

   _____

   _____

CONTINUOUS COMPLIANCE STATUS REPORT (continued)

For a compliant coatings approach using continuous coaters:

- ☐ Compliant coatings (as determined by the VHAP content of the coating in the reservoir and the VHAP content of the coating as calculated from records) and compliant thinners were used each day in this reporting period.

- ☐ Compliant coatings (as determined by the VHAP content of the coating in the reservoir) and compliant thinners were used each day in the reporting period and the viscosity of the coating in the reservoir has not been less than the viscosity of the initial coating.

Indicate below on what dates any noncompliant coatings or thinners were used during the reporting period and why:

_____

_____

_____

For facilities using an averaging approach:

- ☐ This facility has met the emission limits specified in 40 CFR 63.802 for finishing operations every month by using an averaging approach. A copy of the averaging calculation for each month within this reporting period is attached.

- ☐ This facility has not met the monthly average emission limits specified in 40 CFR 63.802 for finishing operations. A copy of the averaging calculation for each month within this reporting period is attached and the months for which this facility was out of compliance are noted below (note that a violation of the monthly average is a separate violation of the standard for each day of operation, unless the affected source can demonstrate through records that the violation can be attributed to a particular day or days during the period):

  _____

  _____

  _____

CONTINUOUS COMPLIANCE STATUS REPORT (continued)

For facilities using a control device approach:

☐ Capture or control devices have not been operated at daily average values greater than or less than (as appropriate) the operating parameter values established in the initial performance test.

☐ The following capture or control devices were operated at daily average values greater than or less than (as appropriate) the operating parameters established on the following dates:

_____

_____

_____

For facilities using a combination of methods:

Indicate combination of compliance methods being used (averaging and control device or compliant coatings and control device), attach appropriate requirements and check appropriate boxes above for both methods:

_____

4. Work Practice Standards

☐ During this reporting period, the work practices in 40 CFR 63.803 were followed in accordance with the work practice implementation plan and the inspection and maintenance plan for this source.

☐ During this reporting period, the work practices in 40 CFR 63.803 were not followed in accordance with the work practice implementation plan and the inspection and maintenance plan for this source.

CONTINUOUS COMPLIANCE STATUS REPORT (continued)

If the inspection and maintenance plan or work practice implementation plan was not followed during the reporting period, please provide an explanation of the reasons for not following the provisions of the plan, an assessment of whether any excess emissions and/or parameter monitoring exceedances are believed to have occurred, and a copy of the appropriate records documenting that the inspection and maintenance plan or work practice implementation plan was not followed. Please state whether either plan is being revised accordingly.

_____

_____

_____

_____

5. Please describe any changes in monitoring, processes, or controls since the last reporting period:

_____

_____

_____

6. Print or type the name of the Responsible Official for the plant:

_____

(Name) (Title)

A Responsible Official can be:

- The president, vice-president, secretary, or treasurer of the company that owns the plant;
- The owner of the plant;
- The plant engineer or supervisor;
- A government official if the plant is owned by the Federal, State, city, or county government; or
- A ranking military officer if the plant is located on a military base.

I certify the information contained in this report to be accurate and true to the best of my knowledge.

_____

(Signature of Responsible Official) (Date)

TABLE 3-3. POLLUTANTS EXCLUDED FROM USE IN CLEANING AND WASHOFF SOLVENTS

Chemical Name	CAS No.
4-Aminobiphenyl	92671
Styrene oxide	96093
Diethyl sulfate	64675
N-Nitrosomorpholine	59892
Dimethyl formamide	68122
Hexamethylphosphoramide	680319
Acetamide	60355
4,4'-Methylenedianiline	101779
o-Anisidine	90040
2,3,7,8-Tetrachlorodibenzo-p-dioxin	1746016
Beryllium salts	-
Benzidine	92875
N-Nitroso-N-methylurea	684935
Bis(chloromethyl)ether	542881
Dimethyl carbamoyl chloride	79447
Chromium compounds (hexavalent)	-
1,2-Propylenimine (2-Methyl aziridine)	75558
Arsenic and inorganic arsenic compounds	99999904
Hydrazine	302012
1,1-Dimethyl hydrazine	57147
Beryllium compounds	7440417
1,2-Dibromo-3-chloropropane	96128
N-Nitrosodimethylamine	62759
Cadmium compounds	-
Benzo (a) pyrene	50328
Polychlorinated biphenyls (Aroclors)	1336363
Heptachlor	76448
3,3'-Dimethyl benzidine	119937
Nickel subsulfide	12035722
Acrylamide	79061
Hexachlorobenzene	118741
Chlordane	57749
1,3-Propane sultone	1120714
1,3-Butadiene	106990
Nickel refinery dust	-
2-Acetylaminoflourine	53963
3,3'-Dichlorobenzidine	53963
Lindane (hexachlorcyclohexane, gamma)	58899
2,4-Toluene diamine	95807
Dichloroethyl ether (Bis(2-chloroethyl)ether)	111444
1,2 - Diphenylhydrazine	122667
Toxaphene (chlorinated camphene)	8001352
2,4-Dinitrotoluene	121142

TABLE 3-3. (continued)

Chemical Name	CAS No.
3,3'-Dimethoxybenzidine	119904
Formaldehyde	50000
4,4'-Methylene bis(2-chloroaniline)	101144
Acrylonitrile	107131
Ethylene dibromide(1,2-Dibromoethane)	106934
DDE (1,1-p-chlorophenyl 1-2 dichloroethylene)	72559
Chlorobenzilate	510156
Dichlorvos	62737
Vinyl chloride	75014
Coke Oven Emissions	99999908
Ethylene oxide	75218
Ethylene thiourea	96457
Vinyl bromide (bromoethene)	593602
Selenium sulfide (mono and di)	7488564
Chloroform	67663
Pentachlorophenol	87865
Ethyl carbamate (Urethane)	51796
Ethylene dichloride (1,2-Dichloroethane)	107062
Propylene dichloride (1,2-Dichloropropane)	78875
Carbon tetrachloride	56235
Benzene	71432
Methyl hydrazine	60344
Ethyl acrylate	140885
Propylene oxide	75569
Aniline	62533
1,4-Dichlorobenzene(p)	106467
2,4,6-Trichlorophenol	88062
Bis(2-ethylhexyl)phthalate (DEHP)	117817
o-Toluidine	95534
Propoxur	114261
Trichloroethylene	79016
1,4-Dioxane (1,4-Diethyleneoxide)	123911
Acetaldehyde	75070
Bromoform	75252
Captan	133062
Epichlorohydrin	106898
Methylene chloride (Dichloromethane)	75092
Tetrachloroethylene (Perchloroethylene)	127184
Dibenz (ah) anthracene	53703
Chrysene	218019
Dimethyl aminoazobenzene	60117
Benzo (a) anthracene	56553
Benzo (b) fluoranthene	205992
Antimony trioxide	1309644

TABLE 3-3. (continued)

Chemical Name	CAS No.
2-Nitropropane	79469
1,3-Dichloropropene	542756
7, 12-Dimethylbenz(a)anthracene	57976
Benz(c)acridine	225514
Indeno(1,2,3-cd)pyrene	193395
1,2:7,8-Dibenzopyrene	189559